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Including the Railroad Gazette and the Railway Age

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ONE of the articles that attracted the most attention in the series on "Defective Box Cars and Damaged Freight," which was published in the *Railway Age Gazette* last spring, was that dealing with box car roofs. A study of the specifications of box cars which have been ordered within the past few months, is of interest in the light of the information which was developed in that article. In a number of cases three or four different types of roofs have been specified on each order, a hundred or more roofs of each type being used so as to enable a good comparison to be made of the service results. In the past when it has been desired to make such a comparison it has too often been the practice to use all of one kind of roof on one order of cars, and then use another type of roof on another order, which was built several months or a year or more later. Or one type of roof might be specified for the greater number of the cars and other types of roofs used on a few cars only. In neither case is it possible to make a thorough and accurate comparison. Another interesting development which has taken place is that several of the roads have arranged to use a water test for the roofs of box cars which are to be used in certain classes of service, such as for carrying flour, cement, etc., where a large amount of damage might be caused by leakage. Greater attention also seems to be given to the details of the construction in order that the cars may not only be water, cinder and burglar proof, but that the cost of maintenance may be reduced to a minimum, even though it may mean a considerable increase in the first cost of the car.

THE initial steps and the progress of the preliminary organization of the "See America First Association," since its inception last May have been briefly noted heretofore in our news columns. On another page of this issue the purposes and plans of the movement are more fully explained, and some of the reasons why such an organization should be successful are convincingly advanced, in an address made by E. L. Bevington, chairman of the Temporary Board of Managers, at the annual convention of the American Association of General Passenger and Ticket Agents at Seattle. Mr. Bevington shows that the proposed organization has already received a great deal of encouragement in the way of assurances of support, and it is believed he has also made a more than adequate reply to the arguments of those interests which feel inclined to prefer to devote all their available appropriations to advertising their individual territories. The belief of many sectional or individual interests that they can accomplish most for themselves by working by themselves might be expected to constitute the most serious obstacle to the consummation of the plans for a permanent organization. Mr. Bevington's answer to them is that "an organization as big and powerful as the one proposed would engender confidence; it would promote publicity in many ways not now available owing to lack of organization; it would solicit and receive contributions from sources which do not now contribute a dollar"; in short, it would help in the promotion of the interests of all from the fund of surplus efficiency which may be created by organized effort as compared with individual endeavor, which is often exerted at cross purposes. It would not interfere with existing methods of advertising, any more than the Associated Press interferes with the individual newspapers it serves in gathering news. It would merely supplement and round out the present work. If the proposed plans are properly carried out there appears no reason why such an association should not be made an effective means of furthering its most public spirited object with material benefit for all concerned.

LAST December the *Railway Age Gazette* published an editorial criticising the practice of officers and representatives of supply concerns in giving costly Christmas presents to railway officers, and urging its discontinuance. The view expressed, while not shared by all our readers, was generally commended, both by railway and supply men. Many supply concerns decided to quit sending presents. Many railway men decided to quit accepting them, and in numerous cases returned those they received. There was one criticism, however, which was quite commonly made against the editorial referred to. This was, that it appeared too late in the season. Many supply concerns had made their annual purchases of gifts before it was published. To avoid a repetition of this criticism, we are calling attention to the subject early this year. Aside from the reduction in present-giving last year, which was large, the situation is the same as it was then. The practice mentioned always has been, is yet, and always will be, objectionable both in purpose and effect. It is intrinsically objectionable because its obvious purpose ordinarily is to influence purchases by railways in an improper way. If it does not accomplish this result

it involves waste of money by the supply concerns. If it does accomplish the desired end it harms the railways. It is further objectionable because it subjects the railways and their officers, and in less degree the supply concerns also, to the liability of very injurious criticism in the magazine and newspaper press. If the practice had gone on unchecked and increasing, the result in time would have been a big scandal, which would have done the railways great harm. As already indicated, it was largely reduced last year; and this year ought to mark its entire abolition. Last year, after the publication of our editorial on this subject, some railway executives publicly indicated that they would disapprove of the acceptance of presents from supply concerns by their officers and employees, and others quietly passed similar word down the line. This year the officers of the supply concerns ought to make such action unnecessary by notifying their representatives that the day for trying to get business from railways by sending more or less disguised bribes to their officers is past, and that the custom must be stopped.

WHEN WILL THE PUBLIC JOIN THE "SAFETY FIRST" MOVEMENT?

THE safety movement now under way is one of the most remarkable developments of modern railroading. The need for greater safety in transportation has been clearly recognized and acutely felt for years. That relatively small progress was long made in reducing the railway accident record was perhaps chiefly due to the fact that most of those who were to blame for it were engaged mainly in trying to shift their part of the responsibility on others. The employees and the spokesmen of their brotherhoods laid the blame on shortcomings of railway plants and operating methods, and agitated for regulation of the railway managements. The managements laid the blame on employees who violated the rules and disobeyed orders. The public and public authorities looked upon the situation superficially, criticized the railway managements and did little of a constructive character. All were busy plucking the mote from their neighbor's eye. Few troubled themselves about the beams in their own.

About two years ago it dawned on some fair minds in the railroad business that the trouble was not that the managements were not doing their duty, or that the employees were not doing their duty, or that the public was not doing its duty, but that all of these classes were neglecting their duty. It was seen that the only way in which each class partly responsible for accidents could effectively perform its duty was for all to perform theirs. This obviously suggested co-operation between managements, employees and public. The safety committee movement, whose keynote is co-operation, resulted. It spread from railway to railway, and now the gospel of "safety first" is being fervidly preached both at many meetings on individual railways and at meetings where numerous railways are represented. The discussion of railway accidents by Commissioner McChord of the Interstate Commerce Commission, and by officers of various railways, was much the most interesting feature of the co-operative safety congress at Milwaukee last week. (See *Railway Age Gazette*, October 4, pp. 636 and 645.) A great meeting of officers and employees of several railways in the interest of safety, is to be held in Kansas City on October 19. The subject of safety will be the main theme at the annual Indiana railway convention, which will be held under the auspices of the Indiana Railway Commission next month. The duty of everyone concerned with railway operation to do all possible to promote safety is being urged at these meetings as the duty of sinners to repent is urged at religious revivals. An earnest searching of hearts all along the line is taking place. An unprecedented enthusiasm for provision and care for the protection of the lives and limbs of passengers and employees is being aroused.

Undoubtedly the "safety first" movement is spreading the knowledge and developing the spirit most needed for the reduction of accidents. The main thing needed is greater care—greater care on the part of the management in providing and maintaining structures and equipment in a safe condition, and in selecting, disciplining and training men; greater care on the part of the employees in making proper use of the safety appliances provided and in understanding correctly every rule made and every order issued, and obeying them to the letter. Unfortunately, however, the "safety first" movement is as yet almost entirely a co-operative movement by railway managements and their employees; and there are many accidents managements and employees alone cannot prevent no matter how well they co-operate or how hard they work. They cannot, for example, reduce the fatalities to the 5,000 trespassers on railway property who are killed every year. Some have suggested as a remedy for trespassing the elevation and more complete fencing of the tracks of railways. These things are worthless as means to the end mentioned. The railways of Chicago have spent about $70,000,000 on track elevation, and never a day passes without there being a great deal of trespassing on the elevated tracks in Chicago. The railway police arrest scores of trespassers on the elevation every month; but the municipal court judges do little but parole or discharge them. In the three months ended July 31, 1912, a single railway entering Chicago had fifty-five trespassers arrested on its elevation, and fifty of them were discharged or paroled by the municipal court judges. Only five were really punished. Thirty-six were absolutely discharged. That is the way that the municipal court of Chicago does its share toward stopping the 5,000 fatalities to trespassers annually. That is the sort of justice that the railways of Chicago receive when they ask for protection of their property against intruders. That is the way that governments, after requiring the railways to spend enormous sums to make their properties safer, do not co-operate with them in making the expenditures effective. There is an adequate ordinance in Chicago prohibiting trespassing on the track elevation, but good laws are worthless unless they are enforced, and trespassing, with its resulting toll of death, will go on as long as public officials have so much regard for the feelings of law-breaking fellow citizens and voters that they would rather see them maimed and killed than fined or jailed. The one way in which the public authorities can most effectively co-operate with railways and their employees in promoting the safety movement on railways is by adopting and enforcing proper measures to stop trespassing.

Another way in which it is absolutely requisite that the public shall co-operate with the railways and their employees, if the safety movement is to be successful, is by letting the railways earn enough money to enable them to make the improvements in their plants that are essential to rendering them safe. Most of the railways of the United States are merely the skeletons of what they ought to be. There are some people who complain because the capitalization of our railways is about $63,000 a mile. The trouble with their capitalization is not that it is too large but that it is too small. It ought to be increased to at least $100,000 per mile by the double-tracking of many lines, the strengthening of much track that is too weak, the general installation of block signals, the purchase of more steel equipment, etc. What we need in this country is not cheaper transportation, but better and safer transportation. The accident record of our railways is often contrasted with the records of the railways of Europe. Transportation on our railways will never be as safe as it is on the railways of England and France and Germany until our roads are put in as good physical condition as theirs. To put them in this condition an enormous capital expenditure must be made. This capital expenditure cannot be made unless the capital can be raised, and the capital cannot be raised until investors can be shown where the means of a paying return on it is to come from.

The safety movement by officers and employees is worthy of all commendation. The attitude of the public and public authorities in regard to the matter of safety thus far merits little commendation and very much condemnation. The public and public authorities demand that the railways do much to promote

safety, but the public itself and the public authorities, with a few distinguished exceptions, such as the Railroad Commission of Indiana, show little disposition to do anything themselves to help the cause along. The co-operation of the three parties—the railway managements, the employees and the public—is necessary to make transportation in this country as safe as it ought to be. The public is now the only one of these parties which has not begun to awaken to a sense of its own duty and to take some steps toward performing it. When is the public going to quit its Pecksniffian complaining about conditions for which it is very largely responsible, and join the railways and their employees in the effort to remedy them?

SOUTHERN RAILWAY.

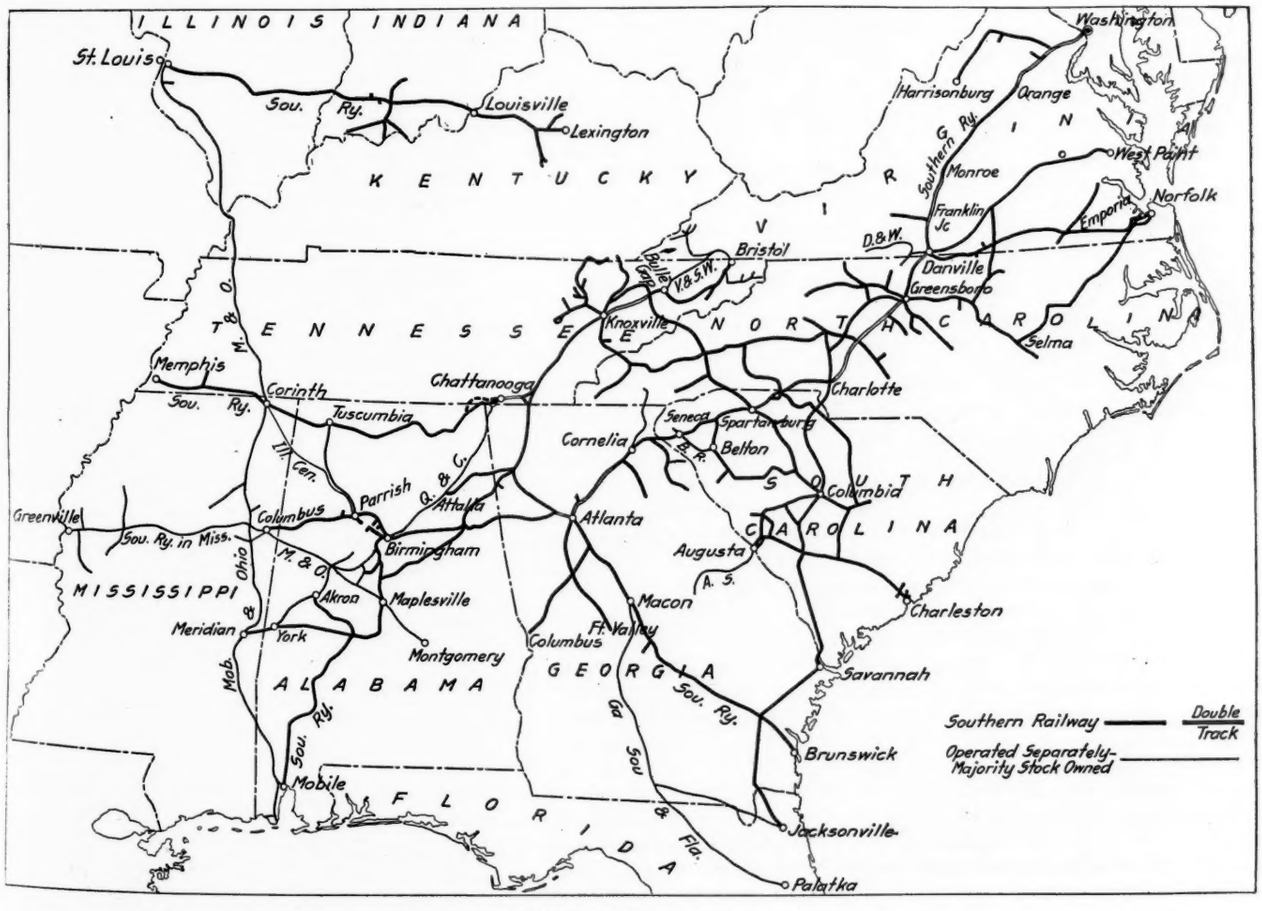
IT is peculiarly fortunate for the Southern Railway that its president is a former traffic man. With over 7,000 miles of road forming a network of branch lines through a comparatively undeveloped part of the country, and with heavy fixed charges and dividend requirements per mile of line, it would seem that the success of the Southern Railway Company depends on its power to develop the territory tributary to its lines. In the Northwest and Southwest, while to a great extent, of course, railroads have developed the country, the country has to a very large extent developed itself. In the Southeast the Southern Railway in particular has assumed the burden of putting its shoulder to the wheel and furnishing the initiative which the country itself, or rather its people, lacked.

It is probably not an exaggeration to say that some thousands of miles of the Southern Railway were built before such construction was justified by purely traffic considerations. If they had been built economically and capitalized conservatively, their addition to a system of main lines would probably not have been an impossibly heavy drain on a company operating main lines and branches as a combined system; but many of these branch lines were not built conservatively and were very much overcapitalized. They were built of cheap material and with poor standards of construction, but, with the hopes of their promoters, capitalized quite freely. It is of only academic interest to discuss the wisdom of taking into the Southern Railway system a great mass of such branch lines at anywhere near their owners' estimation of what they were worth. The fact was that they were taken over, and the problem that has confronted the present management is to make the system as a whole an adequate instrument of public service.

To do this it was essential that sufficient should be earned to pay the fixed charges and to pay a dividend return on the total stock capitalization which would be sufficient to form an equity for bondholders and give the company a credit which would permit of future capital expenditures for extensive betterment of the plant. With a road like the Pennsylvania it is possible to increase net earnings to an extent that will make a fairly large difference in the per cent. earned on the capitalization by savings in operating expenses. This was out of the question on the Southern Railway. The other alternative was to increase gross earnings.

As was pointed out, the part of the system whose operation *at all* was hardest to justify from the standpoint of profits was the great mileage of branch lines. This is the part of the property that was in poorest physical condition; but, on the other hand, the part of the property the development of which would benefit the Southern Railway Company exclusive of its competitors.

On its main through lines the Southern Railway has to meet keen competition often from roads that have had considerably more money to spend on development of the plant than has the Southern. There is the Atlantic Coast Line, the Seaboard Air



Southern Railway System.

Line, the Nashville, Chattanooga & St. Louis, the Louisville & Nashville and the Illinois Central. To secure competitive business it was necessary to develop the main lines so that business could be handled efficiently and promptly, as well as economically. To secure business on the branch lines it was necessary to build up the country.

As a good illustration of how closely and how comprehensively the Southern Railway is a part of the Southeast, it is only necessary to mention the fact that of the total 11,585,839 spindles in all of the cotton growing states reported by the census bureau, there were 8,530,723 spindles in mills tributary to the Southern Railway lines.

While the rest of the country in the past two years has been dragging along through a period of depression or stagnation, the South has been making quite steady and fairly rapid advances in prosperity. To just what extent this development is due to the policy adopted by the present management of the Southern Railway it is quite impossible to say; but that a very appreciable portion of the rapidity of this development and its essentially sound basis is due to the policy of the company and its efforts is perfectly true. Much of the success of this effort is due personally to the president. The results obtained in the fiscal year ended June 30, 1912, are a vindication of the policy of development that has been pursued.

Total operating revenues in 1912 amounted to $63,590,000, an increase of $3,250,000, or 5.38 per cent. over 1911. Operating expenses totaled $43,700,000, or 68.71 per cent. of total revenues in 1912; compared to $40,930,000, or 67.82 per cent. of total revenues in 1911. After payment of fixed charges and rentals there was available for dividends $6,760,000 in 1912, and $6,670,000 in 1911. In April and October, 1911, semi-annual dividends of 1 per cent. were paid, and in April, 1912, a semi-annual dividend of 2 per cent. was paid; and since the close of the fiscal year, a semi-annual dividend of 2½ per cent. has been declared from earnings of the second half of the fiscal year 1912, which puts the preferred stock on the full 5 per cent. annual rate. Dividends amounted in 1911 to $1,200,000, and in 1912, including the dividends declared since the close of the fiscal year, to $2,700,000. There was a surplus credited to profit and loss of $4,020,000 in 1912, and of $5,400,000 in 1911.

The restoration of the 5 per cent. dividend on the preferred stock was not, however, the only notable milestone made in the company's history in 1912. At the beginning of the year there was still carried on the balance sheet $1,690,000 unextinguished discount on securities. From income in 1912 there was charged $60,000 toward extinguishing this discount, and the entire remainder was written off through profit and loss. There was wisdom and essential justice in the managements waiting to restore the full 5 per cent. dividend on the preferred stock until earnings were not only large enough to permit of paying the full 5 per cent. rate, but were large enough to put the company in a position where it could write off the discount on its securities sold; make in the one year 1912 capital expenditures amounting to $5,370,000; increase its cash on hand from $10,380,000 to $13,050,000; and increase its own securities in the treasury through receipts of bonds due from the trustee on account of capital expenditures for additions and betterments and extensions from $16,100,000 to $22,330,000, with a net increase in that year of but $5,250,000 in its outstanding securities.

In his remarks accompanying the annual report President Finley tells in a simple but very interesting way something of what has been done during the past year to develop the territory tributary to the company's lines; and the fact that there were 448 new industrial plants completed at points on these lines during the year bears evidence that this development is not a theory but an important fact. President Finley points out that, in the nine states covered by the Southern, the products of manufactures increased in value in the 10 years ended 1909 by 107.68 per cent., as compared with an increase for all the states during this decade of 79.49 per cent.

The Southern Railway has a land and industrial department, the work of which has been described in the *Railway Age Gazette* previously. In addition, during the year there was established a department of farm improvement work, which includes the cotton culture department and other special agricultural departments which are demonstrating to farmers methods by which the agricultural yield of staple crops of each locality may be increased, as President Finley says, "not on experimental or demonstration farms under special conditions and with exceptional resources, but on their own farms and with their own resources." Consistent effort is being made to induce immigration into the South, especially of the better class of foreigners; such a class, for instance, as the German farmers who have done so much to develop the Northwest. Besides this work of developing local territory and traffic, both the freight and passenger traffic departments have been strengthened and the scope of their work has been very much broadened. Additional agencies have been established throughout the Northwest, Middle West, Pacific coast and Canada, with the double purpose of soliciting and routing freight over the Southern Railway into the Southeast and of cooperating with southern producers in developing markets for southeastern products. President Finley says that passenger solicitation of all kinds is being most effectively aided by the policy of the management to keep its passenger train service, both through and local, fully abreast of the requirements of the traveling public as to frequency of trains and character of equipment.

It will be a notable achievement if the management can make its policy an actual fact. Local passenger service on the Southern Railway has in the past been far from good; and local equipment, while possibly up to the standards pretty generally set by the local passengers in their own living, was not up to the standard in most other parts of the country. Mention has been made in commenting on former reports of the work the railway has been doing in improving and beautifying its stations. If now the passenger equipment can also be improved, these efforts of the company should go far toward helping to raise the whole standard of living in the outlying districts through which it runs.

While in its broader aspects the future of the Southern depends on its development of new traffic it is interesting to watch the changes in operating statistics. The total revenue ton mileage carried in 1912 was 4,207,000,000, an increase of 2.89 per cent. over 1911. There was an increase of 4.31 per cent. in number of tons carried; but the average haul was only 155 miles in 1912, as compared with 157 miles in 1911. The receipts per ton per mile were 9.87 mills in 1912 and 9.66 mills in 1911. With this increase of 2.89 per cent. in ton mileage, there was a decrease of 1.15 per cent. in freight train mileage and a decrease of 1.76 per cent. in freight locomotive mileage. Freight train revenue per train mile was $2.467 in 1912 and $2.324 in 1911. The average train load is low, as would be expected on a property that has such a large proportion of branch line mileage and of whose tonnage only about 31 per cent. is coal. The train load in 1912 was 250 tons, an increase over 1911 of a little over nine tons, or 3.96 per cent. While the average number of cars in each freight train was 24.75 in 1912, as against 24.22 in 1911, the average number of empty cars was 7.54 in 1912, as against 7.67 in 1911.

With the rapidly increasing prosperity in the South there are two dangers which suggest themselves as possible checks from the point of view of the Southern Railway to this prosperity. With the increase in intrinsic value in land through the improvement of farms there may be a temptation to sell on the part of the rural population and to move into the cities. This tendency to concentrate in cities is to be found not only in the South but is a problem that all railroads have to contend with. On the other hand, land values in the Southern cities are now nominally high, and in a great many cases city real estate has been mortgaged by its owners and the money received from the mortgage spent in luxuries. Liquidation under circumstances like these might seriously affect the prosperity of the South for two or three years.

The Southern Railway is heavily capitalized. When the development of the country reaches the stage where a new program of heavy expenditures on capital account for additions and betterments will have to be adopted, will the company's credit be such as to enable it to sell additional securities at a reasonable price? This has been the problem which has faced the Southern Railway ever since it became one property. When this stage was reached in regard to the main lines in 1906 the combination of the panic in the money market in 1907 and the depression in general business that followed was almost more than the Southern Railway's credit could bear; nevertheless, the company did succeed in carrying out its program of heavy revision work on its principal main lines and the discount on the securties sold is now wiped out. There is every indication that the policy of the present management is far-sighted enough so that when in the future it will become necessary to again go into the market for capital funds, it will have established a reserve credit through a development of earning power larger proportionately than the increase in dividend disbursements or the increase in interest requirements through the sale of securities that will be sufficient to overcome the handicap of its capitalization.

The following table shows the principal figures for operation in 1912, as compared with 1911:

	1912.	1911.
Average mileage operated	7,088	7,042
Freight revenue	$41,508,300	$39,498,964
Passenger revenue	16,939,811	16,056,304
Total operating revenue	63,590,329	60,345,063
Maint. of way and structures	7,841,220	7,464,916
Maint. of equipment	10,108,673	9,460,757
Traffic	1,745,353	1,549,404
Transportation	22,081,653	20,662,086
Total operating expenses	43,696,236	40,926,790
Taxes	2,452,328	2,212,968
Operating income	17,506,519	17,163,277
Gross corporate income	21,086,594	20,965,795
Net corporate income	6,763,117	6,670,003
Dividends	2,700,000	1,200,000
Additions and betterments	44,989	66,046
Surplus	4,018,128	5,403,958

ATCHISON, TOPEKA & SANTA FE.

THE annual report of the Atchison, Topeka & Santa Fe is the record of operations of a number of separate corporations operated as one system in practically four grand divisions known as the eastern lines, western lines, the coast lines and the gulf lines. The total system comprises 10,733 miles, and in 1912 the company operated an average of 10,628 miles. Total operating revenues amounted to $107,750,000 in 1912, and to $107,570,000 in 1911. Notwithstanding a good many adverse conditions, the company had net corporate income available for dividends of $19,660,000 at the end of 1912, as against $21,270,000 net corporate income for 1911.

The Santa Fe operates under such different conditions on different parts of its line that average figures for the entire system may conceal offsetting changes in operating conditions to an unusual extent. The system as a whole, however, did better last year than might have been expected from the monthly returns, and better than might have been expected from the very severe weather conditions which prevailed on the eastern lines during the past winter. On a system so extensive as this there have naturally been experiments in methods of operation and in standards for both roadway and structures and equipment and at times this may have led to higher maintenance costs and may be the cause of the increasing cost of maintenance of locomotives mentioned elsewhere. Such experiments have on the other hand led to the adoption of very high standards. The system has been welded together as a whole financially into one of the most conservatively and soundly capitalized railroads operating west of the Mississippi river. The company is, so far as is known, managed independently of any particular group of bankers or financiers, and for that reason enjoys a degree of confidence with investors which in the long run offsets any lack of interest in its securities because of their smaller speculative possibilities. The Southern Pacific and the Union Pacific have such vast holdings of the securities of other companies that their income can hardly be farily compared with that of the Santa Fe.

The Santa Fe is a railroad property pure and simple. Its earnings of $10,139 per mile on its 10,628 miles form the great bulk of its total income. In 1912 there was $2,570,000 other income, and in 1911, $2,210,000. The standards of upkeep on this great property have been high. Maintenance on certain parts of the road is necessarily very expensive; no great proportion of the traffic is furnished by low grade commodities, and the operating ratio when compared to the Union Pacific or the Northern Pacific seem high. It was 66.15 in 1912 and 65.79 in 1911. When it is remembered, however, that 22.18 per cent. of the total tonnage carried, which in 1912 amounted to 21,150,000 tons, was furnished by products of agriculture, and that 17.70 per cent. of the total was furnished by manufactures, and but 30.95 per cent. by products of mines; and when, moreover, it is taken into consideration that a great deal of the products of agriculture, and manufactures as well, moves on a fast schedule, necessarily in smaller trainloads and over very heavy grades in places, the operating ratio of a little over 66 per cent. does not seem by any means excessively high. Furthermore, the fact that under severe weather conditions, with increases in wages and under other adverse conditions, the company was able in 1912 to hold the operating ratio down to within less than 1 per cent. of what it was in 1911, makes the showing particularly good.

Total operating expenses amounted to $71,270,000 in 1912, as against $70,770,000 in 1911. Maintenance of way and structures cost $16,080,000 in 1912, which was only about $20,000 more than was spent in 1911. Maintenance of equipment cost $16,520,000 in 1912, and $16,690,000 in 1911. The Santa Fe's accounting department divides operating expenses as between passengers and freight, and as between divisions for the use of the management, but these allocated expenses are not shown in the company's annual report. Figures are shown, however, in the report for the total cost of maintenance of locomotives, passenger and freight cars.

The following table is taken from the report for maintenance of equipment. In this are shown maintenance costs, including renewals, depreciation, superintendence, shop machinery and tools, injuries to persons, etc.:

	1912.	1911.	1910.	1909.	1908.
Per locomotive	$4,382	$4,545	$3,832	$3,133	$3,714
Per locomotive mile	Cents 15.91	Cents 15.80	Cents 12.87	Cents 11.95	Cents 13.74
Per passenger car, including mail and express	$1,010	$1,158	$1,249	$1,134	$1,040
Per passenger car mile	Cents 1.11	Cents 1.30	Cents 1.36	Cents 1.17	Cents 1.11
Per freight car	$100	$88	$108	$120	$106
Per freight car mile	Mills 9.5	Mills 8.3	Mills 9.1	Mills 11.1	Mills 10.0

The increase in cost of maintenance of locomotives in the five years given on both the per locomotive basis and the per mile basis is noticeable. The following table shows the cost in mills per ton mile, for repairs only, to locomotives. This figure would mean little, if anything, as between two different roads, but for use as comparing costs from year to year on the same road, where the proportion of passenger traffic to freight traffic has not changed materially, it is of use. The trainload shown in the table, as well as the ton-miles, are total ton mileage of freight, including company freight, but not including weight of equipment:

	Train load.	Ton miles.	Cost of repairs of locomotives.	Cost, mills per ton mile.
1912	400	8,900,297,587	$7,577,550	.851
1911	395	8,996,064,486	7,650,762	.850
1910	389	9,238,639,440	6,155,042	.666
1909	366	7,705,853,520	4,756,678	.617
1908	367	7,989,607,656	5,771,985	.722

As shown above there was a slight decrease in ton mileage carried amounting to about 1.1 per cent. The num-

ber of passengers carried one mile totaled 1,274,000,000 in 1912, and 1,269,000,000 in 1911. Freight train mileage totaled 19,640,000 in 1912, and 20,150,000 in 1911, a decrease of 2.5 per cent. Passenger train mileage totaled 20,950,000 in 1912, and 20,180,000 in 1911, an increase of 3.8 per cent.

It is rather interesting to note that the average cost per mile run for fuel, when coal and wood was used, was 13.12 cents, and when oil was used, was 16.77 cents. This is in 1912. In 1911 the cost for coal was 12.45 cents, and for oil, 17.02 cents. While the mileage of loaded cars amounted to 477,000,000 in 1912, as against 475,000,000 in 1911, the mileage of empty cars amounted to but 196,000,000 in 1912, as compared with 203,000,00 in 1911.

In 1912 the Santa Fe spent $10,280,000 on additions and betterments, of which amount $3,300,000 is charged to income and the remainder to capital account. There was a total increase of $13,540,000 in the outstanding bonds. The cash received from the sale of these bonds was used for the additions and betterments just mentioned, and is also reflected in the added cash on hand. At the end of 1911 there was $36,200,000 cash on hand and in the bank, and at the end of 1912 this had been increased to $41,900,000. It will be seen that the Santa Fe is in a very strong position as regards working capital, and has in fact sufficient cash to permit of quite extensive additions and betterments or extensions without the further sale of securities. There are no loans and bills payable.

Some of the larger expenditures for additions and betterments made during the year were $2,870,000 spent for new locomotives, $977,000 spent for ballast,* $937,000 spent for rails,* $874,000 for grading, and $782,000 for track laying and surfacing. The new construction work is mentioned at some length in our construction news columns in this issue.

President Ripley calls attention to the continually increasing burden of taxation. In the five years ended June 30, 1912, taxes have increased 68.1 per cent., while total operating revenues have increased but 15.0 per cent., and net operating revenues but 4.8 per cent.

* These are additions and betterments. The ballast is only charged to this account if it is applied to track that has not before been ballasted, and the rails are additional weight of rail or rail in new track or sidings.

The following table shows the principal figures for operation in 1912 as compared with 1911:

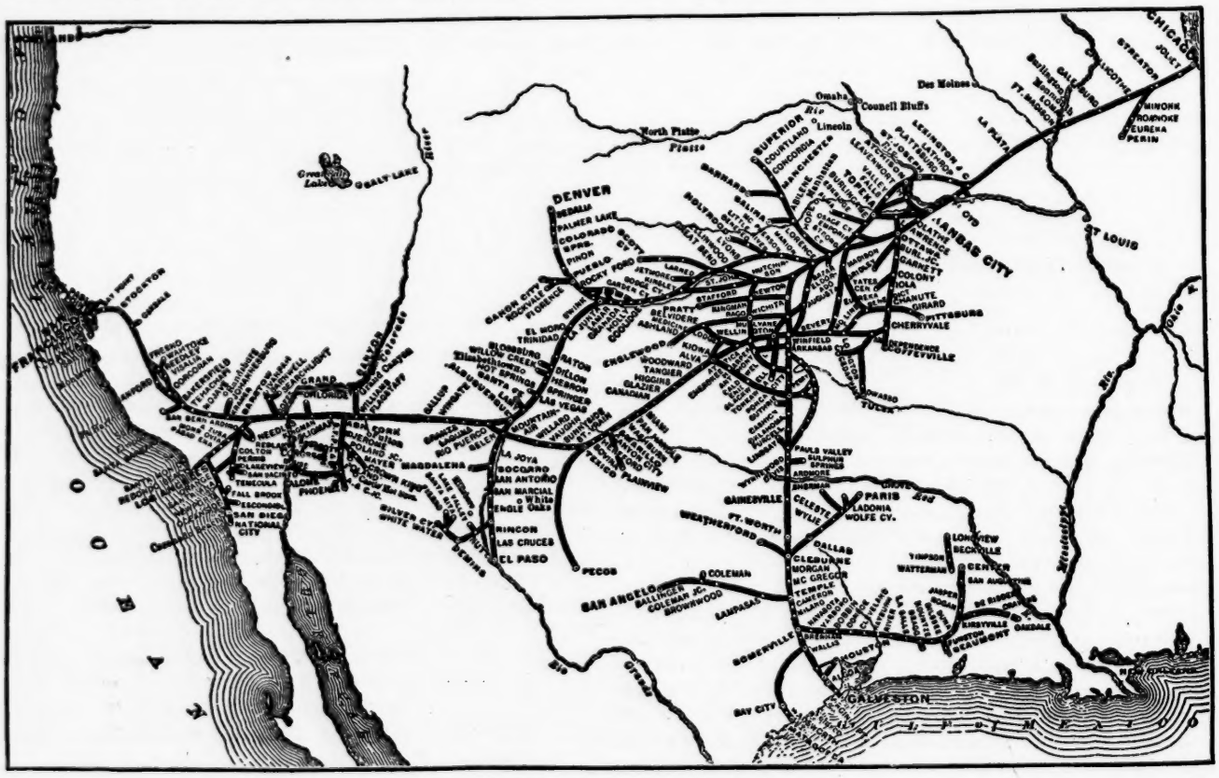
	1912.	1911.
Average mileage operated	10,628	10,350
Freight revenue	$71,529,575	$71,787,201
Passenger revenue	27,453,525	27,204,868
Total operating revenue	107,752,360	107,565,116
Maint. of way and structures	16,076,834	16,059,787
Maint. of equipment	16,521,231	16,686,145
Traffic	2,416,746	2,249,899
Transportation	33,733,667	33,183,520
Total operating expenses	71,273,203	70,768,252
Taxes	3,474,607	4,206,544
Operating income	33,322,257	32,272,503
Gross corporate income	35,529,623	34,842,671
Net corporate income	21,371,068	19,660,241
Dividends	15,876,875	15,641,150
Additions, betterments and fuel reserve	3,696,960	5,414,140
Surplus	86,406	315,778

NEW BOOKS.

Railway Operating Statistics. By C. P. Mossop, head of statistics department, North Eastern Railway of England. Published by the *Railway Gazette*, Queen Anne's Chambers, London. Price, 2s. 6d. (65 cents).

Manual of Railway Statistics. By George L. Boag, assistant manager, Great Southern of Spain Railway. Published by the *Railway Gazette*, Queen Anne's Chambers, London. Price 4s. ($1).

These two books on railroad statistics are both written by Englishmen; but in both of them a rather broader and more nearly American view is taken of the value of railroad statistics, and especially the value of ton-mile figures, than is supposed to be held by most English railroad men. Mr. Boag has had a varied experience as a railroader, having been on the Lancashire & Yorkshire of England, the Argentine Transandine of South America, and the Southern Nigerian of Africa before he became connected with the Great Southern of Spain. Mr. Mossop's book was undertaken mainly for the information and use of students attending the North Eastern Railway classes. The greater part of the tables and diagrams used as illustrations are taken from those in use on the North Eastern. Mr. Mossop describes the principal figures that his experience on the North Eastern has led him to believe are necessary to secure operating efficiency. He discusses ton miles, wagon miles and commodity statistics; wagon and train loading, and train oper-



The Atchison, Topeka & Santa Fe.

ating costs; warehouse costs, yard costs, passenger statistics, and what he calls "rolling stock user." By this he means statistics which will show the use made of rolling stock, limiting rolling stock to cars, both passenger and freight. He summarizes the figures that are of most value as a test of the use made of cars, as ton miles per car mile, car miles per car, and ton miles per car. The book is interestingly written and contains a great deal of information that should be of considerable value to American railroad officers, notwithstanding the fact that in a great number of cases the British usage would serve mainly as a contrast to usage in this country. Such a contrast is often quite instructive; and the refusal of the English to split hairs in their statistical compilations, and their tendency to use a certain common sense, regardless of the logic involved is interesting. While it may offend all the traditions of the American auditor's office, it should nevertheless prove highly suggestive even to the American accounting officer who may feel that his methods are far more refined than those of the English statistician.

In the Manual of Railway Statistics, Mr. Boag has made good use of his breadth of experience. He is familiar with American railroad practice and theory; and while his opinion is that American practice and theory may not necessarily be adapted to use either in England or on transcontinental roads, he applies the theories which underly this practice as a test to both English and other methods of compiling statistics in a way that makes his conclusions well worth careful study by expert American railroad accounting officers who have had experience only on roads in the United States. The book is a handy size and contains, beside five very carefully thought out chapters on statistics by Mr. Boag, three appendices which, so far as we know, are not found anywhere else in so convenient a form. These appendices are: 1, Report No. 1 to the English Session of the Railway Congress, by Sir Thomas Rees Price; 2, Railway Companies Act, of the British parliament, 1911, prescribing a form of accounts and returns to be made by railroad companies; 3, Schedule to the Reservation, by Mr. Acworth, Sir George Paish and Mr. Peel, showing forms for reporting engine hours, carriage mileage, wagon mileage, etc. There is a short bibliography not intended, apparently, to be at all comprehensive.

Strength of Materials. By Mansfield Merriman. Bound in cloth. 166 pages; 5 in. x 7¼ in. Published by John Wiley & Sons, New York. Price $1.

The sixth edition of this standard work, the first edition of which appeared in 1897, has been revised and reset and a new chapter on combined stresses has been added. Intended for classroom work, this book discusses the elementary principles of mechanics with reference to the common materials used in engineering construction. Numerous problems illustrating the various principles are scattered throughout the book.

International Railway Fuel Association. Proceedings of the Fourth Annual Convention, Chicago, May 22-25, 1912. Bound in paper. 315 pages, illustrated. Published by the association, C. G. Hall, C. & E. I. R. R., McCormick building, Chicago, Secretary. Price, 50 cents.

There is probably no feature of locomotive operation that presents as great opportunities for improvement as in the methods of firing and the practices on some of the more progressive roads were fully illustrated and demonstrated. Other important subjects discussed were the inspection of fuel, the use of anthracite coal and locomotive drafting. In the latter paper, H. B. MacFarland, engineer of tests, Santa Fe, presented some startling figures in connection with the amount of power consumed by back pressure on a locomotive. He also gave preliminary figures of some experiments he is making with artificially induced draft. Dr. W. F. M. Goss presented a paper on the subject of fuel as a factor in locomotive capacity, in which he outlined a locomotive that possibly may be required in the future, which had 150 sq. ft. of grate area. Each subject aroused most active and valuable discussion, all of which is included in the proceedings. A list of members with their addresses has also been inserted in this volume.

Letters to the Editor.

TENDER DERAILMENTS.

Cincinnati, Ohio, October 1, 1912.

To the Editor of the Railway Age Gazette:

I have noted with interest an article on page 569 of the issue of the *Railway Age Gazette* of September 27, 1912, entitled "A Fortunate Wreck," by E. W. Summers, president of the Summers Steel Car Company, and your editorial comment on page 561 touching on the matter of tender derailments.

Mr. Summers' suggestion of a more flexible connection between truck and car is undoubtedly one that will deservedly attract the attention of mechanical department and maintenance of way department officers, but my experience with derailments of engine tenders and the action taken to prevent such accidents on lines with which I have been connected, leads me to think that the true cause of many of these derailments has not been mentioned in the articles above referred to.

I have had occasion, in several cases, to investigate the cause of tender derailments and have found that the side bearings of the tender trucks were located farther apart than the rails of the track. It has been my good fortune, in several such instances, to see the location of the side bearings on the tender trucks changed so that they were well within the vertical lines through the gage side of the rail, after which no more such derailments of tenders took place.

I have known, of course, of derailments of tender trucks from causes other than that above mentioned, but I have seen so many instances of an epidemic of tender derailments completely cured by the simple process of moving the side bearings in towards the center of the track so that they will be a less distance apart than the rails in the track, and I have observed so many cases of derailments of freight cars in which the only apparent cause was a similar location of side bearings outside of the rail support, that the danger of so locating side bearings on trucks seems to me to be well demonstrated and the practice, even in modern freight car construction, of placing the side bearings on trucks 60 in. or more center to center, to be indefensible.

Curtis Dougherty,
Chief Engineer, Queen & Crescent Route.

W——, Mass., October 3, 1912.

To the Editor of the Railway Age Gazette:

In his explanation of tender derailments, in the *Railway Age Gazette* of September 27, page 570, Mr. Summers says, "In this letter I shall endeavor to cover another phase of the subject so clearly that it will be readily understood." Now the treatment seems not to be clear, probably because the application of some of the principles are assumed to be understood. May we not examine these for a moment?

If any unbalanced force imparts to a body a velocity v in t seconds, the acceleration will be $\frac{v}{t}$, and the force must be $\frac{w\,v}{32.2\,t}$. The average speed will be $\frac{v}{2}$, and the distance through which the force acts must, therefore, be $\frac{v\,t}{2}$. The product of the force and the distance through which it acts is $\frac{w\,v}{32.2\,t} \times \frac{v\,t}{2} = \frac{wv^2}{64.4}$, is the work done upon the body to give it its velocity, or its stored energy, and is the work which the body will do in overcoming such resistances as will bring it to rest. [Considerable additional work will have to be done to produce rotation, as in the case of a car wheel, but that will not be considered here.] The stored energy, then, gives indication of the force acting *only when considered in connection with the distance through which that force acts in bringing the body to a stop.* Since the velocity of the wheel is practically unaltered, it follows that the expression $\frac{w\,v^2}{64.4}$ gives no indication of the reaction at the rail in the way indicated by Mr. Summers.

Moreover, if it was possible to measure the slight retardation

of the wheel and the yielding of the obstruction, the amount of the reaction would be determined by the application of the principle of the conservation of energy: that is, the product of the resistance and the distance through which it yields must equal the *loss* of stored energy, in whatever direction that resistance acts. Any force that merely aids in guiding the wheel without yielding, has nothing to do with the quantity of work done at the resistance. Stored energy is, therefore, entirely different from force, and cannot be resolved into components as attempted in the explanation referred to.

Now in order that a raised obstruction should strike the tread at a point 4 in. in advance of the center of the wheel, its height must be about ½ in. above the lowest point of the tread. Is it common to work trains at a speed of a mile a minute over such obstructions? To slew a heavy truck around in an instant, cause two wheels to slip and to rise an inch or more in running over the rail, would require many times the resistance of an object even ½ in. high.

Many liberties have been taken with the tender which have not been taken with cars. The center of gravity is often the highest of that of all the vehicles of the train. Both the truck wheel base and the total wheel base are short. The trucks are of a type which gets out of square and on which bolts and rivets get loose. The side bearings are not successfully kept free. The drawbars sometimes incline almost enough to lift a tender off the track. And the lateral resistance of the modern stiff spring buffer tends to transmit the violent lateral oscillations of the long overhang of the engine, particularly in the case of engines with radial trailer trucks. G. E.

COURTESY AT THE PARCEL ROOM.

New York, October 1, 1912.

To the Editor of the Railway Age Gazette:

The editorial note in your issue of September 27, page 561, commending the courteous and efficient conduct of the attendants at the parcel room in the Grand Central station, New York City, is only deserved recognition of good and efficient service. It would be a fine thing for the railway service generally if the efforts of faithful and intelligent employees at stations and on trains could always be thus recognized. Unfortunately, it is, in most cases, impossible to give this recognition with any good effect.

But while I fully agree with all that you have said, I think it is no more than fair that your readers should know that at the Grand Central Terminal the passenger pays 10 cents for a service which is worth to him about five, and which costs probably not over two or three cents. As I have intimated, I am not complaining at the 10 cent rate; I am simply pointing out that when a passenger gets really first class and wholly efficient service he is quite likely to find that he is paying for it a good stiff price. The concession at the Grand Central Terminal has been in the same family for forty years, and if the present holder is not a millionaire it is not the fault of the people who drop thousands of dimes into his coffers every week, if not every day. Your note only emphasizes the difference between a man who is working intelligently to keep a good thing, a very good thing, and a boy or a disabled trainman, kept in a dark and stuffy prison 12 or 15 hours a day, working for small wages and having no prospect of ever getting any more. This last is what we often see at the ordinary parcel room.

In this connection, what is the explanation of the action on the part of some prominent railways recently in advancing the prices of parcel room service from five cents to ten? In a large city where rents are very high, quite likely the rate of ten cents is fair; when one goes into the extravagant atmosphere of a large city he expects to pay large prices for everything. But at some of the smaller stations a five cent rate would seem to be more reasonable. It should be borne in mind that the prime object of a parcel room is the accommodation of the passengers, not the piling up of revenue.

Again, why is it that the practice is so diverse in the matter of consolidating items? At some stations one has to pay 30 cents for storage for a half hour, of a small satchel, an umbrella and a light overcoat. Can it be that a traffic manager who aims to please the public intends thus to mulct his friends on such a small bargain? And it is a bargain which the passenger has occasion to make quite frequently. One element of the popularity of the man at the Grand Central Terminal is his liberality in little matters of this kind. This liberality, of course, would make sad havoc with red-tape rules framed by a general passenger agent a thousand miles away; but it is a potent instrumentality in making friends of the public. Pleb.

DISTANT AND CAUTION SIGNAL.

Hohokus, September 30, 1912.

To the Editor of the Railway Age Gazette:

In your comment on my letter in the issue of September 20, you say:

"A caution signal means run cautiously over the first foot of the track beyond the signal. We cannot require this to be done by a fast train unless there has been a warning in the rear of that signal. But if a distant indication is to be given, this rear warning is not needed, and is not given. Thus we shall have the anomaly of a train which is moving at a mile a minute just before reaching a signal, being required to come down to perhaps ten or 15 miles an hour instantly after passing the signal."

Now there are many caution signals in the country that require trains to "run cautiously over the first foot of the track beyond" them, without previous warning. The typical example is the caution indication of a manual block home signal that has no distant. Such a signal also indicates "stop" on occasion. The engineman must know that there is no distant and must approach the home so that he can stop if necessary; he can then very easily run cautiously past the signal if it so indicates. In the same way he must know any other signal that may require him to run cautiously over the first foot of the track without previous warning. These cases are of course *due to lack of needed signals* and, although numerous, must be treated as exceptions to the general rule that previous warning should be given for a stop signal, and equally for a caution signal that requires a train to run cautiously at the signal.

Where previous warning is provided for—and so long as the exceptions remain, enginemen must know the conditions at each signal—the first caution signal encountered by an engineman running his train at full speed (his last signal indication having been "proceed") should mean, not run cautiously over the first foot of the track, but promptly get down to cautious running after observing the signal. A second caution signal, observed when he was already running cautiously, could then properly require him to continue running cautiously past that signal. There would, then, be no anomaly in treating a distant signal as a caution signal. C.

[We print our esteemed correspondent's letter, because of our esteem; and also because we think that in the half dozen words which we have italicized, he answers himself. As "Hohokus" is a center of wisdom and of high standards in signaling, we had not suspected that "C" would recognize as even conditionally acceptable an arrangement of signals under which trains can run at high speed only in fair weather.—Editor.]

Navigation Plans for Bolivia.—The Madeira-Mamore Railway, Brazil, proposes to place steamers on substantially all the navigable rivers of the eastern portion of Bolivia during 1912, to be operated in connection with the railway.

ELIMINATION OF SMOKE FROM LOCOMOTIVES.*

Methods Successfully Used on Large Switching Locomotives Operated in Busy Yards in Double Crewed Service.

By D. R. MacBain,
Superintendent Motive Power, Lake Shore & Michigan Southern.

Eliminating the emission of dense black smoke from the smoke-stacks of locomotives, hand-fired and burning bituminous coal, is a problem whose solution has been conscientiously attempted for a great many years by railroad mechanical officers.

The first efforts in this direction that I can recall involved the careful instruction of firemen, but with the aid of no mechanical appliance save that of the blower. In effect, the fireman was instructed to maintain a good, clean, live, solid fire, and to feed not more than one shovelful of coal at each firing—two at the most—keeping the shovelfuls as far apart as possible, so that the gases distilled from the green coal would come in contact with a bright fire of very high temperature and be consumed. The instruction also pointed out that if too light a fire were maintained, too much cold air would be admitted through the grates, and would cause the temperature of the whole firebox to fall too low to effectively consume the freshly distilled gases.

As a result of conscientious, expert effort on the part of the firemen, especially in the New York and Chicago districts, where I was familiar with the conditions, some splendid work was done, and I have seen heavy freight and passenger trains taken from the starting point to beyond the city limits—as much as 15 miles—without a jet of black smoke being emitted. In-so-far as we could obtain the services of skilled and intelligent firemen the results were fairly satisfactory, but the number of men possessing those qualifications was not great enough to meet the demands and it naturally devolved upon the inventive mind to produce something that would mechanically supply that which was lacking in skill, in order to effect a more satisfactory solution of the smoke problem.

Without attempting to place them in the order of their importance, the things that are necessary to successfully avoid the emission of smoke on hand-fired terminal power—that in which the public is mostly concerned—are:

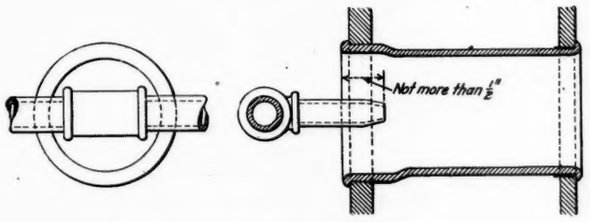


Fig. 1—Arrangement of Steam Jets.

First:—A boiler and firebox in as nearly perfect condition as possible.

Second.—Careful, intelligent and vigilant effort on the part of the engine crew.

Third:—Proper care of boiler appurtenances.

Fourth:—A good blower of sufficient size.

Fifth:—The time-honored steam jet arrangement for the introduction of sufficient quantities of air over the top of the fire, when needed.

Sixth:—A suitably designed brick arch, properly installed and maintained.

Seventh:—Good drafting of the locomotive so that forcing the fire will be unnecessary.

Eighth:—A well-proportioned superheater.

Ninth:—The proper cleaning of smoke emitted from engines being fired up at engine houses.

The utilization of any one of the above will accomplish something in the way of smoke elimination, but the use of all of them combined will result in work very close to the 100 per cent. mark at all times, even with the use of the most highly volatile fuels.

The flues should be kept tight and clean at all times, and the openings in the grates should be kept open. The grate operating rigging should be kept in good condition so as to be easily operated, and so that the grates can be shaken often enough to admit of the proper admission of air through the fire at all times.

A good blower is necessary and an operating valve on each side of the cab within convenient reach of both engineer and fireman is most desirable, in order that either may start the blower quickly in case of necessity.

The use of the steam jets in the firebox in connection with the blower, as an aid in the prevention of smoke, is essential, as, if the jets are used without the blower, sparks may be blown back into the cab. Fig. 1 illustrates the manner in which the steam jets should be arranged. It will be noted that the jets should not enter the outside of the air tube more than ½ in., and it has been demonstrated that 40 or 50 lbs. steam pressure is ample for their use. That pressure will suffice to develop all the benefit that can be derived from the use of the steam jets, and the noise incidental to their use will be much reduced and rendered less objectionable. It is therefore advisable to apply a steam reducing valve in the line between the throttle and the jets. The steam jets drive the currents of cold air closely over the surface of the fire in such a manner as to cause an intermingling with the escaping gases and thus aid in their combustion. A good job of smoke prevention can be accomplished with the blower and steam jets in combination, provided the engine crew is properly instructed and that conscientious and intelligent use is made of them.

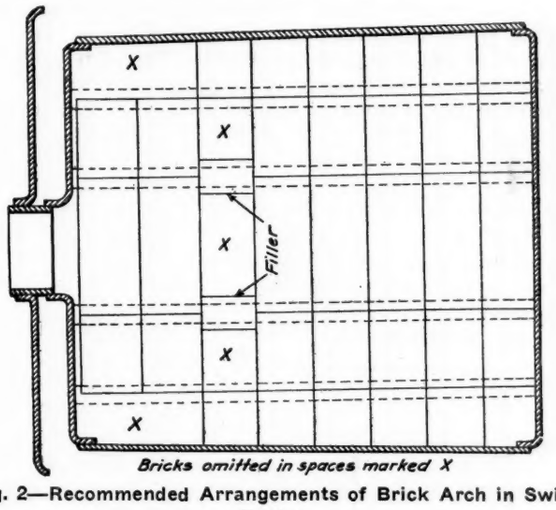


Fig. 2—Recommended Arrangements of Brick Arch in Switch Engines.

The next essential in securing the best results is a suitably designed brick arch, the installation of which on power doing work of an intermittent nature, such as on switch engines, where long continued service is not necessary, should be about as

* Presented before a meeting of the International Association for the Prevention of Smoke, at Indianapolis, Ind., September 25, 1912.

shown in Fig. 2. On road engines the bricks marked X are not used. The addition of the arch, acting as a baffle wall, produces an even flow of the gases of a uniform temperature, and by reason of the fact that the arch is incandescent and the gases are compelled to travel a greater distance before reaching the flues, combustion is materially improved and smoke emission is reduced correspondingly.

In drafting a locomotive so that it will generate steam as freely as possible, and at the same time obviate the necessity of crowding the fire, there are a number of points that ought not to be lost sight of. There should be a permanent door opening; that is, some arrangement whereby there will always be not less than one-eighth of the door area open and unobstructed for the admission of air over the top of the fire, whether the engine is standing or working. The opening under the diaphragm should be not less than four-fifths of the total flue area. The diameter of the smoke-stack should be not smaller than four times the diameter of the nozzle, if the nozzle is round. I do not, however, recommend a round nozzle, as the rectangular nozzle, shown in Fig. 3, has proved superior to it.

The reasons for referring to the nozzles and smoke-stack in connection with the elimination of smoke are that easy egress to the atmosphere of the steam jet from the exhaust and the gases entrained thereby is essential, and when this condition prevails the sound of the exhaust at the top of the stack will be soft and hollow. A restricted area for the exhaust steam and entrained gases to escape through will cause a harsh, tearing sound at the top of the stack, which is neither scientifically correct nor necessary in steam production. The ideal condition is to have the steam jet from the exhaust nozzle pass out through the center of the smoke-stack, without coming in contact with

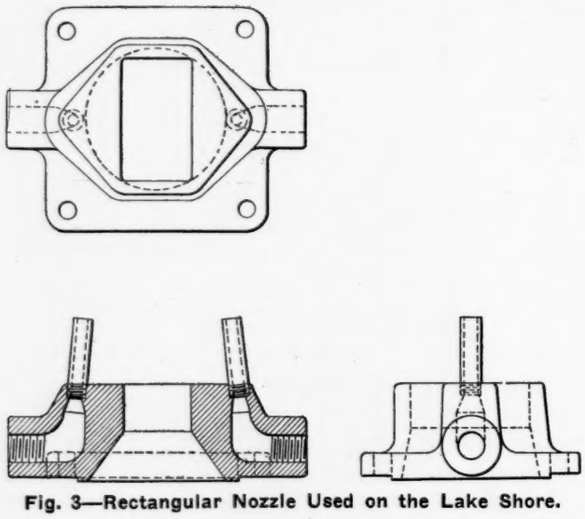


Fig. 3—Rectangular Nozzle Used on the Lake Shore.

the walls of it at any point. The jet should pass out with a liberal clearance all around so that the gases may be entrained properly and carried out to the atmosphere without interference, as shown on Fig. 4. Unless the foregoing conditions are observed and provided for, the exhaust in ascending will have a sidewise tendency. The effect of this will be that the steam jet from the nozzle will scour up the side of the smoke-stack, and in doing so the entrained gases will be scraped off, so to speak, interfering materially with the draft on the fire, and invariably resulting in a smaller nozzle being used than is necessary to increase the velocity of the jet to get the required number of cubic feet of gases for each cylinder full of steam that is used.

The smoke-stack should not be longer than is necessary to carry the gases over the top of the cab, in which case, if the stack is not too small in diameter, the steam jet from the nozzle will not expand sufficiently to fill the stack at the top. The rectangular nozzle having the long dimension parallel with the longitudinal axis of the engine, will re-shape the steam jet after it leaves the saddle, and consequently it will not pass out angularly and strike the side of the stack: it also insures a full entraining area around the whole circumference of the jet, resulting in easy steam generation, which is a most important function in the elimination of smoke.

The well-drafted engine with ample blowers, steam jets and brick arch, can be operated with very little smoke emission, if handled with reasonable care.

The final step in the accomplishment of smoke prevention lies in the application of a superheater. A superheater of the proper size installed in a switching engine reduces the consumption of

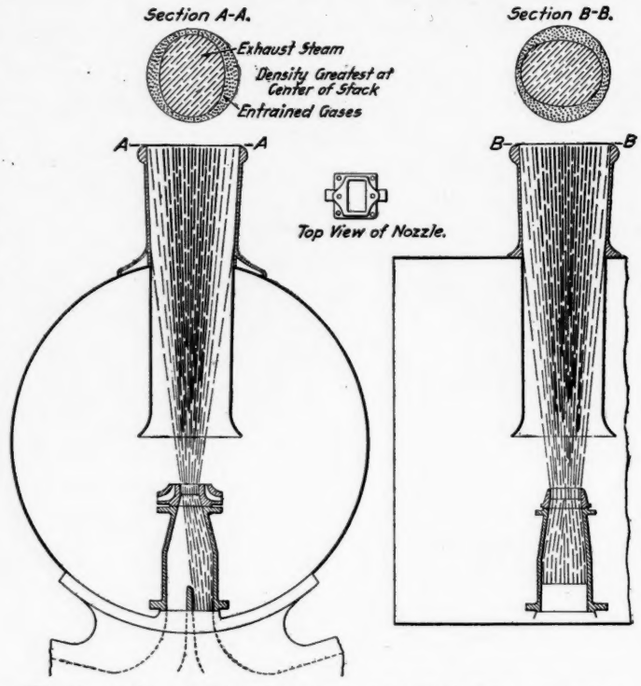


Fig. 4—Action of Exhaust Steam with Rectangular Nozzle.

coal and water approximately 40 per cent., and therefore it necessarily follows that the emission of smoke will be correspondingly reduced.

To sum up, well-drafted locomotives equipped with ample blowers; the steam jet arrangement to take care of what little smoke is made by putting in a fresh fire; a well designed and properly installed brick arch, together with a superheater, will permit of practically 100 per cent. smoke prevention, even with fuel of the highest volatility. In addition to eliminating the smoke, two large standard switch engines equipped as above, operating in busy yards, have completed a year of double-crewed service and have never had a flue expanded or caulked, which from a maintenance standpoint cannot be overlooked.

To stop the emission of smoke from the stacks of cold locomotives that are being fired up in engine houses, is a task not easy of accomplishment: in fact, to our knowledge, no means have been developed that will cope with this feature, and consequently the next important and necessary move is to provide some method of taking care of the smoke thus made; viz., cleaning it to a point that will render it unobjectionable before it is turned out to the atmosphere.

There is a device which, in my opinion, will accomplish this result, and the first practical installation will be made on a new thirty-stall engine house now in course of erection by the Lake Shore & Michigan Southern at Englewood, Ill. This device will take out 100 per cent. of the carbon, and upwards of 75 per cent. of the acids and gases. It is expected that the house will be ready for occupancy by December 15, 1912.

ANNUAL CONVENTION OF THE AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.

The American Association of Railroad Superintendents held its annual meeting at the Planters hotel, St. Louis, on September 19 and 20, with an attendance representing the wide scope of the association.

The session opened with an address by P. W. Conley, president of the St. Louis division, who welcomed the visiting members on behalf of the St. Louis division, which acted as host for the occasion. Following this T. B. Fogg, general manager of the Toledo Terminal, read a paper highly commending the successful work of the American Association of Freight Agents in the formulating and enforcement of rules that have brought about the proper marking and handling of freight. As this was a subject the superintendents were much interested in, a resolution was adopted that the full report of the work of the Freight Agents' Association be referred to the transportation committee to consider and report at the next meeting any recommendations that it thought might help in the work of the agents, and that this association extend its congratulations to the Freight Agents' Association on the good work already accomplished.

President E. H. DeGroot announced that in response to a request from the Master Car Builders' Association a committee had been appointed to act with the committee the M. C. lettering of cars, Charles Burlingame, superintendent of the Wiggins Ferry Company, is chairman.

The report of the executive committee, which included that of the transportation committee, recommended some changes in the articles of organization of the association. An annual session of two days with social features included in the programme was recommended instead of the semi-annual one-day sessions.

General superintendents are to be made eligible for membership and members of the train rules committee, in case of vacancy to be filled, may be appointed by the president. Provision is to be made for the establishment of local divisions and proper co-operation with them. A committee was appointed to work out these features in a revision of the articles and submit its work to the next meeting of the association.

Charles Burlingame read an interesting paper on "The Identity of Men Employed in Train and Yard Service," outlining a simple and practical system of safeguarding the railways from employing men whose records made them objectionable to the service. The paper was referred to the transportation committee for a report at the next meeting.

R. C. Richards, general claim agent of the Chicago & North Western, delivered an address on "Safety First," outlining the history of the movement as first worked out on the Chicago & North Western, and adopted by other lines, and describing in a graphic and entertaining manner the methods employed and the results obtained, showing that in the twenty months the system had been in operation on the North Western there had been a decrease of 25.9 per cent. in deaths and 29.1 per cent. in persons injured. In the discussion that followed the address, it developed that most of the lines represented at the meeting had adopted the safety committee plan, some with modifications, with the result of a gratifying decrease in the number of accidents. The association tendered a vote of thanks to Mr. Richards for his address.

The morning session of the second day was occupied in the consideration of an exhaustive report of the train rules committee of the Train Despatchers' Association of America on the proposed revision of the standard code as requested by the American Railway Association. The committee had made an exhaustive study of the train despatchers' code and had thoroughly revised it, making many recommendations of changes calculated to improve the service. This committee has been maintained since 1888.

J. F. Mackie, secretary of the Train Despatchers' Association of America and editor of the *Train Despatchers' Bulletin*, addressed the convention, explaining the work of the committee and its recommendations, and stated that the report had been adopted by the Train Despatchers' Association at its recent convention in Louisville, and it was now passed to the superintendents' association for its approval.

J. E. Scott, chairman of the train rules committee of the Train Despatchers' Association, read the report, explaining it item by item. At the close of the discussion a resolution was adopted approving the recommendations of the committee and recommending its adoption by the American Railway Association. A resolution was also adopted commending the work of the Train Despatchers' Association, and petitioning the American Railway Association to arrange with the management of all lines so that despatchers, members of the Train Despatchers' Association, may be allowed their time while attending annual association meetings and despatchers, members of committees of the Train Despatchers' Association, be allowed their time and expenses while at committee meetings of the association.

Charles Burlingame read a paper on "Losses in Handling Bad Order Cars," treating of the loss occasioned by hauling bad order cars long distances to get them home instead of repairing them where they are found in bad order, and suggesting methods by which this might be done, thus effecting a great saving to the railroads in the matter of repairs and keeping the cars more regularly and continuously in service.

The committee on interchange car inspection recommended that the association render all possible assistance to the joint committees of the Association of Transportation and Car Accounting Officers and the Master Car Builders' Association in working out the problem of joint interchange and car inspection at the various interested points and making it effective in all large interchange centers by such adaptations as may be found advisable and consistent.

The committee also recommended that the association urge the Master Car Builders' Association to consider the advisability of amending its rules so as to make car owners chargeable with all repairs to their own freight cars in accordance with prices provided for in the M. C. B. code, this charge being warranted by the adoption of the 45 cent per diem rate effective January 1, 1913.

It was also recommended that the association bring to the attention of the American Railway Association the desirability of a change in A. R. A. car service rule 15 (A) to make it read: "When necessary because of defects denoting unfair usage, as defined in M. C. B. Rules 37 to 43, inclusive, unless without transfer repairs can be made in twenty-four hours as per M. C. B. Rule 107. When different allowances are shown for loaded and empty cars, the empty allowance shall apply." This is intended to prevent the abuse now practiced through the transfer of lading for minor defects, the cars being reloaded and forwarded without repairs by the road making the bill.

The committee further recommended that the association give to the Master Car Builders' Association its support and assistance in every way that it possibly can, and ferret out and inaugurate a successful method of overhead inspection of box cars as per Master Car Builders' Association circular No. 39, 1911-1912, subject, Report of Committee on Overhead Inspection of Box Cars. A resolution was also adopted expressing approval of the action of the arbitration committee of the Master Car Builders' Association in submitting to the railroads of the country the question of eliminating the penalizing features in the Master Car Builders' code.

The St. Louis division discharged its duty as host for the visiting members in a thorough manner, providing an automobile ride for the ladies and children through the park and residential district of the city, luncheon at the Planters' hotel for members and their families, dinner in the evening and a theater party for members and families, and on the second day an automobile tour, for ladies and children, in St. Louis county, with a chicken dinner, country style, in the middle of the ride.

PREVENTION OF ACCIDENTS ON RAILWAYS.

Thorough and Detailed Study by Experts of the Direct and Indirect Causes of Personal Injuries in Railway Work.

Last week we gave a brief account of the Co-operative Safety Congress, which was held at Milwaukee, Wis., September 30-October 5, and also reproduced the address on accident regulation by the government which was made by C. C. M'Chord, member of the Interstate Commerce Commission. Abstracts of three other addresses which are of special interest to the railways follow:

SHOP AND ENGINE HOUSE ACCIDENTS.

In a paper on "The Prevention of Accidents in Shops and Roundhouses," George Bradshaw, general safety agent of the New York Central Lines, said that although the training of the human element is important in shops and roundhouses to prevent accidents in the use of tools, machinery and appliances, a very large percentage of accidents at these places is caused by improper physical conditions and improper methods, rather than from personal carelessness. Although most of the states have safety appliance laws and factory inspectors who see to their enforcement, these laws are too general and indefinite, and at the best can only accomplish a small part of what is really required to make the machines and shops reasonably safe. For instance, in all of the shops of the New York Central Lines a force of men has been at work for some time installing safeguards, although in all cases these shops have been examined by the factory inspectors and have been pronounced safe.

Familiarity with machinery from constant use has a tendency to create in the minds of many operators a sense of disregard for the hazards existing. The application of a practicable safeguard not only serves to prevent injuries from the use of the machine, but indirectly impresses upon the operator the importance of safety precautions on his part. The machinery should be so guarded that the most careless and reckless man in the shop will be protected. As far as possible the safeguards should be so constructed that if it is necessary to remove or displace them they will automatically return to their proper position when the operator has finished whatever adjustment he has been making. Mr. Bradshaw described in a general way the kinds of safeguards which should be used on different classes of machines. He called attention to the fact that the shops should be well lighted to prevent injuries which are often indirectly due to insufficient light. For certain classes of work employees should be furnished with goggles for protecting their eyes against flying particles. A prolific source of injury to employees in both shops and engine houses is the obstruction of aisles and passage-ways by tools, rubbish and material. Positive instructions should be issued and enforced requiring all employees to keep the passage-ways clear. One shop was mentioned in which the passage-ways are clearly indicated by white lines on the floor and the employees are required to keep the space between these lines entirely free of obstructions. The foreman, if he is properly impressed with the importance of accident prevention and is personally interested in the subject, can be a most important factor in the prevention of accidents.

CARELESSNESS OF EMPLOYEES.

A. Hunter Boyd, Jr., chairman of the general safety committee of the Baltimore & Ohio, presented a paper on "Prevention of Accidents Caused by the Carelessness of Employees," an abstract of which follows:

I am assuming that the railroad company has done, or is doing, all that it reasonably can to avoid accidents, and therefore I will discuss only those accidents caused primarily by the negligence or the carelessness of the employees. Our experience has taught us the necessity of the company doing everything within its power in the way of accident prevention in order to enlist the support of the men. It is on the divisions where the company has done effective safety work and has carried out most of the safety committeemen's suggestions that we receive the most earnest support from the men.

While my subject might include all accidents caused by the negligence of employees, whether to passengers, trespassers or others, I will limit it in the main to employee accidents. Leaving out of consideration the trespassers, we find that of the 5,112 killed in the year to June 30, 1911, 3,602 were employees, and of the 144,545 injured, 126,039 were employees. Seventy per cent. of the killed and 87 per cent. of the injured were railroad employees. My omission of trespassers from this calculation is not because I would minimize the seriousness of that situation, but rather because I think it evident to all that we can accomplish little by safety work in that direction so long as the federal, state and municipal governments refuse to lend any effective aid.

Industrial Accidents.—The so-called industrial accidents are not nearly so serious in character as those in connection with the operation of trains; but in the year ending June 30, 1911, 63 per cent. of the railroad men injured were injured in industrial accidents. Our problems here are similar to those of every employer operating factories and shops. . . . It is undoubtedly true that the railroad company can, without the assistance of its employees, prevent a much greater proportion of the industrial accidents than of other railroad accidents. Effective guarding of all classes of machinery, clean and well-lighted shops, goggles and other precautions carried out leave comparatively few serious injuries to be attributed to the employees. On the Baltimore & Ohio we found that most of our industrial accidents, other than those to be prevented by the employer, are the minor ones caused by the careless handling of tools and material. Unquestionably these are to a large extent difficult to prevent, as the most careful of us at times are injured in very much the same manner, even when we are not distracted by the noises of machines and the bustle of the shops. To reduce this class of accidents we endeavor to get the shopmen and other industrial workers as much interested as possible in the safety movement by placing them on committees and sub-committees, by distributing safety bulletins among them, and by posting caution signs on machinery and at any place of danger in the shops with the safety emblem above the words "caution" or "warning." In short, we try always to keep the safety idea before the men in every conceivable manner. But guards on machines will not prevent accidents if not used, and unworn goggles will not protect the eyes. There must be constant supervision by foremen to see that the safety appliances are made use of, and the hurrying piece worker must not be permitted to place speed and pecuniary gain above the safety of himself and of his fellow employees.

Train Operation.—Accidents occurring in connection with the movement of engines or cars are killing 88 per cent. of the employees who are killed and are causing a very large majority of the serious injuries.

Excluding train accidents, these accidents in the year ending June 30, 1911, caused the deaths of 2,524 employees and injuries to 39,952, and in the injury list are contained most of the railway cripples, men with one arm or one leg, or, too frequently, men without a leg or without an arm. These accidents—coupling or uncoupling cars, switching, coming in contact with overhead or side structures, falling from cars or engines, getting on or off cars or engines, struck by cars or engines—cannot in any large measure be prevented by the employer. Few, if any, more known safety devices can be furnished. With the exception of the elimination of structures of insufficient clear-

ance, the best the employer can do is to keep the appliances in proper condition. These are, in the main, accidents due to some failure of the employee.

Many of the most serious accidents of this class are the result of dangerous practices. Probably the most deadly of all is that of adjusting couplers by hand or foot just as the cars are coming together. In the year ending June 30, 1911, 209 employees were killed and 2,966 injured while coupling and uncoupling cars. On the Baltimore & Ohio alone 6 men were killed and 167 injured in this manner. For a great many months on our road two men each month lost limbs as the result of coupling and uncoupling cars. It is undoubtedly true that no real automatic coupler has been invented, and that it is frequently necessary to adjust the drawbar; but it is certainly not asking much of the men to urge them to refrain from adjusting couplers when the cars are about to come together. They are paid for their time; they lose nothing by taking the time to couple safely; they risk everything by not taking sufficient time. On the Baltimore & Ohio we met with intimations from some of the men that they were practically required to couple in an unsafe manner or be disciplined for delaying trains. In answer to this President Willard, at a large safety meeting in Baltimore, said:

> I want the men to feel that in the matter of their line of work they are to take time to do it as safely as possible. The day of the link and pin coupling has passed, but our reports still show that many men get injured and lose their fingers from time to time by getting them in between the cars as they come together. We would rather that the cars come together and go back again any number of times in order to give you time to open the couplings, rather than that you should be injured.

and this declaration was followed by a positive written rule prohibiting men from going in between cars to adjust couplers when the cars are about to come together. But more effective than any rule of the company is the co-operation of the employees. Between three and four hundred safety committeemen have been spreading this new doctrine among the other men, with the result that where eleven of our men lost hands or feet in the first three months of this calendar year, during which time we were organizing our safety work, but two men suffered similar injuries in the next three-month period.

I have dwelt on this one practice at considerable length, not only because this situation was so serious on our road when we started our safety work, but also because it illustrates numerous other well-defined dangerous practices that can be broken up by safety committees. For instance, we found a number of serious accidents resulting from men riding on pilots—the pilots of our engines unfortunately having broad rims on them, an invitation to the men to ride there. We are now correcting this trouble by removing the rims, but until that work is completed we have issued orders prohibiting the riding on pilots. Here, again, we found the work of our safety committeemen and the co-operation of the men generally far more effective than any rule can ever be, and have had numerous instances of engineers refusing to move their engines until brakemen and others had gotten off the pilots.

Unfortunately, however, our task is not so easy as to be confined to the breaking up of well defined practices. Most of the employees are killed and injured in accidents which cannot be prevented by rules or their enforcement, or by any specific advice or warning. Negligence, carelessness, forgetfulness, are broad and general terms, and it is extremely difficult to get down to the definite and concrete when dealing with accidents resulting therefrom until after the accident has happened. In the year ending June 30, 1911, 2,237 employees were killed and 35,463 injured while attending switches, falling from or getting on or off cars or engines, being struck by cars or engines and by other accidents in connection with the movement of trains exclusive of coupling and train accidents, and of accidents due to insufficient clearances. Here are the majority of the deaths and serious injuries of our employees, and here is the heart of the safety work. Without a safety committee the operating department of a railroad can, if it will, effectively guard machines, install safety appliances and make working conditions, tools and premises reasonably safe, but without safety committees the managements can do little to reduce the number of such accidents as I have just mentioned. Here, indeed, we have to get down to the "human element," to educate, warn, advise, and above all, keep it up incessantly and without let-up. It is a battle that can never end if lasting results are to be obtained.

We must reach the individual, and through him his fellow worker and so on throughout the ranks. Starting out with some hundreds of safety committeemen we can feel assured that these men will not only not take unnecessary chances, but will be more careful on trains and on tracks than they were before they were instilled with the safety idea. As an illustration of this, on the Baltimore & Ohio we had three hundred safety committeemen at work for the first six months, and only two or three of these received injuries, none of which were serious, and in each of these cases the injury did not result in any degree through carelessness of the injured man. A large majority of these men were employees in the ranks, engaged in hazardous work. Against that record, counting all of our employees, officers and clerks, one out of every six was injured last year so as to be incapacitated from work for more than three days. By changing committees from time to time, other men get on them and are imbued with the same spirit. Practically all of the retiring members will continue to be real safety men and gradually, by getting the co-operation of most of the men not on the committees, we shall find less negligence, less carelessness, less forgetfulness and less accidents. We shall never reach the ideal, but can come so much nearer to it than we have in the past that all of us, officers and employees, will be ashamed of the accident record of the last few years.

To instill "safety first" in the minds of the men we ask our safety committeemen to talk safety at every opportunity to the men individually, at their lodge meetings and in every gathering place; to discuss recent accidents and consider how similar accidents can be prevented in the future. We hold night meetings, to which employees and their families are invited, using a stereopticon in addition to talks to graphically present the dangers to the men. . . . Our committee has attended lodge meetings of the Brotherhood of Railroad Trainmen, at their invitation. Our safety committeemen and ex-committeemen wear safety buttons. We are about to post certain safety rules in the cabooses. . . . On the Baltimore & Ohio in the year ending June 30, 1912, slightly over 50 per cent. of our employees killed were killed by being struck by trains. This large percentage was partly due to our dense traffic on the main lines of the system, with trains running on two, three, and in some places four tracks, but with all that it is a frightful record from a single cause. Our section gangs have instructions, which are generally complied with, to step off all running tracks when a train is passing, and we have been making considerable headway in the reduction of accidents to track laborers. But a very large percentage of those killed in this manner on our road are trainmen, in the past year the trackmen killed comprising but 30 per cent. of those killed in this manner.

Train Accidents.—Train accidents are the only kind noticed by the public at large; they are the accidents that are emblazoned on the front pages of newspapers, and that kill and maim our passengers. The number of passengers killed may represent a very insignificant proportion of the total number carried during the year, but no statistical figuring of that kind will satisfy the public, and it ought not to satisfy railroad men. Aside from the fact that we as individuals are shocked by the horrible collisions that occur at more or less regular intervals, we also recognize that they are among the most potent causes of anti-railroad sentiment and the authors of burdensome laws. Most collisions, the most deadly class of train accidents, are unquestionably due directly to the careless acts of employees.

How to teach employees to avoid mistakes of the kinds just mentioned is essentially safety work, and a discussion of that

question would be merely a repetition of my remarks in regard to employee accidents. In concluding this discussion, therefore, I want to direct your attention to the responsibility of the railroad managements, not for the furnishing of insufficient appliances or equipment or track, but for the failure to properly train and supervise the men who operate the trains. It is merely an attempt to get at what the *Railway Age Gazette* recently said was the "cause of causes."

It may be said that we get the best men that we can, that they are always under close supervision, are required to know the rules, and are checked by surprise and other tests, but are you satisfied in your own minds that such is the case? Does not almost every serious accident investigation bring out the fact that some employee at least did not know the rules, or had habitually violated them? Can any of you say that in your journeys over your road and through your yards you seldom find men violating or stretching the rules? I mean rules affecting the safety of trains. Is it not time for railroad men to face this question honestly, and is it not better to correct the evil now than to invite more burdensome laws? I realize that conditions are widely different, that some roads have better informed, better disciplined employees than have others, but consider the average American railroad, or, indeed, consider the best American railroads, and tell me honestly, is a reasonable effort being made to enforce operating rules; reasonable, I mean, when you take into consideration the millions of passengers whose lives and limbs are at stake? Are we doing our duty when we send men out to operate trains without being certain that they know the rules and how to apply those rules; or when we overlook infractions of rules in those cases where no accidents happen; or, worse still, when, by our silence, at least, we encourage the infraction of rules because delay is thereby prevented or some lost time is made up? That this evil does exist in a greater or less degree throughout the country will be admitted, I believe, by any fair railroad man. The editorial of the *Railway Age Gazette* on the "cause of causes" was commended by Vice-President and General Manager Park, of the Illinois Central, who strongly urged real efficiency tests and their faithful carrying out; by a superintendent who frankly admitted that "we are only occasionally imposing discipline for fast running when an investigation would probably have shown conditions were unsafe for the speed actually made," and was commented on by a general manager who clearly recognized conditions as they exist today.

Along this same line was an interesting discussion in the *Railway Age Gazette* last March on the question of speed as an important factor in causing railway accidents. Whatever view we may have on this subject it is incontrovertible that many accidents would have been prevented had the trains in question been running at a more reasonable rate of speed. Of course, speed is a relative term, and 60 miles an hour is safer on some lines of road than 30 miles an hour on others, but, with all that, on many railroads in this country today "safety first" is not the real moving force that its name implies when it encounters the forces of competition and the desire to break records. "The public demands speed," is a well worn phrase, but it does not lift one ounce of responsibility from the shoulders of the operating officers in charge of train movements.

Lax discipline can by no means be laid at the door of the operating officer alone. He must contend with conditions that handicap him on every side. In these days of railroading by commissions the superintendent is compelled to spend much of his time in explaining the affairs of yesterday and has little time left for attending to the affairs of today. Many laws passed ostensibly for the purpose of making railroading safer and better are so artificial and impracticable as to make worse the very conditions sought to be corrected. Many of the laws that we all recognize to be good in principle do not go to the heart of the trouble. The hours-of-service law which very properly prohibits service by trainmen for more than 16 hours, does not attempt to govern the actions of the employees in their hours of rest. I was told recently of a telegrapher who engaged in the business of paper hanging each day at the conclusion of his nine hours of duty, and who was so busy in that undertaking that he was compelled to paper a certain house on Sunday. . . . No law can compel a man to sleep or to rest; but our federal government could and should, in fairness and with reason, prohibit these employees affected by the hours-of-service law from engaging in any form of business or employment beyond the time prohibited by law. If it be impracticable to go further than this by law, the railways should supplement the law by such rules as that put into effect on the Baltimore & Ohio in 1908, prohibiting all employees engaged in work connected with train operations from using intoxicants, either on or off duty, under penalty of dismissal, or that recently adopted by the Baltimore & Ohio and the Delaware, Lackawanna & Western to the same effect, with the further prohibition against men visiting saloons or places where liquor is sold and enjoining the men to use their time while off duty primarily for obtaining ample rest. The railway brotherhoods should realize their responsibility in this matter. These organizations should realize that they can do no greater wrong than that of urging the employment or retention in service of unsafe men. It is a wrong against the public, the railway, the passengers, the other employees—yes, even against the unsafe man himself and against his family. We shall have far fewer accidents when the time comes, if it ever comes, when grievance committees, instead of urging the retention of unsafe men, will urge the dismissal of such men from the railroad service.

PREVENTION OF ACCIDENTS TO TRAINMEN.

S. M. Braden, general superintendent of the Chicago & North Western, read a paper on this subject, of which the following is an abstract:

The problem of preventing accidents to trainmen and enginemen as well as other employees is one that has engaged the attention of railway managers in an increasing degree during the past few years.

In the earlier days of railroading the employee was expected and required to be aware of and to assume the risks involved in train operations and, while the density of traffic remained light, the risks were few and fundamental only.

Railroading was then in its infancy and the possibilities of the future were not fully appreciated by those in charge. Immediately following the close of the civil war, however, the transportation necessities increased rapidly and in much greater measure than transportation facilities, with the inevitable result that facilities were hastily provided with the single idea of quantity without reference to quality.

It is not, therefore, to be wondered at that during this period of rapid expansion in facilities and forces more attention was paid to the, at that time, recognized essentials, than to the conservation of the lives and limbs of the employees.

Human life was held cheap, and mutilated men were a common sight in the days immediately following the civil war.

Railway managers in more recent years, however, have been brought face to face with a necessity for conservation of both labor and materials and, regardless of the circumstances producing this situation, it is gratifying to note that their conservation policies are now being extended to cover the lives and limbs of their employees.

All railways of any importance issue what are known as operating rules, and the present standard rules which are in use on practically every railway in America are the result of many years experience, and if observed by the employees generally, would reduce the accidents occurring to train and enginemen, as well as yardmen, very materially.

It is unfortunate, however, that included in the vast army of railway employees we find such a variety of characters that among them there are, through the inability of employing officers to determine in advance of their employment who are and

who are not fitted for railway work, many, or at least some, who are not sufficiently impressed with the importance to the whole organization of a strict compliance with these rules.

Such a leaven in a body of this character is a serious menace to the organization as a whole, and while it is the constant effort of division as well as general officers to eliminate such undesirable employees from the service and to neutralize the unfavorable influence, the fact remains that there is a well defined disposition on the part of the *average* employee to evade, if not actually violate, the rules designed for their protection.

There is also a growing tendency, on the part of the railway employees' organizations, to interfere with division and general officers in the application of discipline covering infractions of various operating rules.

While railway managers in general have no prejudice against the organization of their employees for their protection and betterment, and appreciate the advantages, both to the employees and to the companies of treating with their employees as an organization rather than as individuals, they naturally and with reason look with considerable apprehension upon the indicated intention of the organizations to furnish protection to their members without reference to the effect upon discipline.

Operating rules, through a process of elimination and evolution, now cover practically every function of an employee. Many of them might, to a layman, appear ridiculous and unnecessary, but experience has proven that it is only a small percentage of human beings in any avocation that can be depended on to exercise judgment and good common sense in many situations, hence the necessity for such a broadening of the scope of operating rules. Many rules are an insult to the intelligence of employees who are intelligent and loyal, but are an absolute necessity in their present form to control and guide the man who is inexperienced or reckless, or indifferent.

A careful investigation of the accidents involving loss of life and limb among the employees in train and engine service shows that in a large percentage of accidents in which such employees were injured, the real cause is the failure of some fellow-worker to do his full duty.

In many cases the immediate cause is hard to determine, but in 99 per cent. of the cases a searching investigation will develop the fact that somewhere and somehow someone has slighted his work or failed to measure up to the standard requirements both of rule and duty.

For instance, a locomotive breaks an important piece of its mechanism while running at full speed. The break may be, for example, in the side rod. The engine does what we call "strips herself." While the stripping is being done the engineer or the fireman or both, and in some cases the forward brakeman, if on a freight train, are killed or injured by the flying pieces; occasionally a whole trainload of passengers is involved in such an accident and the results are too frequently a matter of record and comment in our press despatches. Investigation may show that some two weeks before, when the engine was in the shops for general or running repairs some machinist charged with the duty of properly assembling and fitting the parts failed, through any one of a variety of causes, to do a good job. Following him an inspector, charged with the duty of absolutely knowing that the work had been done properly, through carelessness or indifference, or both, failed to detect the error. Subsequently the engineer, to whom this engine is assigned, fails to measure up to his full responsibility, and, being a little late in getting around, makes his inspection hurriedly, if at all, and concludes that the engine must be all right because he knows the machinist who did the work and the inspector who passed upon it, and has such confidence in their ability that he neglects his part in the chain of precautions; and the results are chronicled in the newspapers. We have therefore come to appreciate the absolute necessity of protecting our men from the results of carelessness of their fellow employees.

Accidents to trainmen, enginemen and yardmen are classified under various heads. We classify them in our safety work as avoidable and unavoidable. Our efforts are most strenuously put forth to place the so-called unavoidable accidents in the avoidable class and by various means reduce the avoidable ones to the minimum, which theoretically is zero.

With this idea as a basis, viz., that all injuries to trainmen, enginemen and yardmen are the result of failure on the part of some fellow-worker to comply with the rules or exercise ordinary prudence, railways in general have organized their officials and employees into bands of missionaries and inspectors known as safety committees. The first requisite in any movement of this character is enthusiasm directed and held in proper channels by a well developed organization.

In our safety work we have given especial attention to remedying the various dangerous conditions and practices which have a tendency to produce death or injuries to our train employees. Careless habits we endeavor to correct and in the event that moral suasion is ineffective we resort to the severest discipline. We hope our employees in train service generally appreciate our efforts to weed out the inefficient, careless and ill-adapted employees, and as time goes on, we hope to secure a closer co-operation on the part of our men in our efforts to eliminate the employee who has no fear for his own safety and no regard for the safety of others.

We have not, in our safety work, made any effort to feature prominently the accidents occurring to passengers and patrons, believing that the elimination of the causes producing injuries to our employees would bring about such care in train operation as would practically eliminate injuries to our patrons. Further, we have felt that by making the employee feel that our efforts are for his individual benefit we would be able to secure a closer and more lasting co-operation on his part.

The results attained indicate that our analysis has been correct. Tabulation of casualties occurring during the 19 months ending July 1, 1912, compared with these occurring during the previous 19 months period, indicates a decrease of 27.8 per cent. in the number of persons killed and of 31.2 per cent. in the number injured on the Chicago & North Western Railway system, not including the C. St. P. M. & O. During the same period the number of trainmen killed was reduced by 55 per cent., and of injured by 44.1 per cent.

Assuming that each and every railway in the United States, assisted by its employees, should have been able during the year ending June 30, 1911, to have made such a reduction in deaths and injuries to trainmen as was made by the railway we represent during the 19 months ending June 30, 1912, viz., 55 per cent. in killed and 44.1 per cent. in injured, there would have been in these United States 269 less funerals with their attendant and subsequent horrors and hardships, and 2,221 less occasions to call in the services of the surgeon, 269 less widows left, in many cases with children or aged dependent parents, and approximately 11,105 less persons adversely affected either financially or otherwise by reason of the disturbance of the usual equilibrium due to relations borne by those injured to their families and the community.

To this body of electrical engineers we appeal for assistance in the humanitarian movement of conserving human life. You have a fertile field and the crops should be bumpers, but like the average farm, your fields need more intensive cultivation.

Railways are waiting for an automatic train control which is fool-proof and practical, and which will effectually prevent careless, reckless, indifferent or incompetent engineers from running into a zone of danger. There is, of course, and as usual in connection with all radical and important improvements such as an automatic train stop, a very considerable difference of opinion among those having the responsibility for train

operation as to the wisdom of any further effort to reduce responsibility of the individual employee by substituting automatic devices which are dependent for their efficiency upon painstaking and efficient maintenance.

There is ample ground for argument both pro and con in this connection. On the one hand, we are confronted with the argument that the installation of automatic safety devices has a tendency to relieve our trainmen and enginemen from responsibility they are now assuming, and which it is claimed they should continue to assume, rather than to place these responsibilities upon mechanical devices which might be efficient or the reverse, depending in a large measure upon proper maintenance by a force paid much less wages than our trainmen and enginemen receive; that the installation of automatic train stops will merely pass the responsibility on from a highly paid and long-tried employee to one of less experience and less pay; that the transference of some of the responsibilities of an engineman to a mechanical device and to the maintainers in charge tends toward a certain decrease in efficiency on the part of highly-paid and supposedly alert and experienced employees; that in connection with the use of the suggested device it will not be possible, through surprise tests and other methods now employed, to maintain proper observances of our present signal devices.

All of these arguments are more or less pertinent, and in some respects temporarily convincing. On the other hand, and viewing the situation from the angle disclosing the absolute necessity for protecting the lives and limbs of our train and enginemen, as well as the lives and property of our patrons, we are face to face with a condition which must be met and the problem solved in a manner that will satisfy our patrons and permit us to sleep with clear consciences. With automatic train stop devices that are so constructed as to produce stoppage not only when danger is imminent, but whenever the mechanism is out of order as well, as is provided in connection with automatic block signals, i. e., showing a stop indication not only when the block in advance is occupied, but when the mechanism is not working properly, and under no circumstances showing a "false clear" indication, we believe it will be as easy, by surprise tests and the various other expedients necessarily resorted to at present in connection with block signals, to retain that sense of personal responsibility on the part of our employees which is considered so necessary.

It is certain that if by mechanical and electrical devices a reasonable percentage of accidents due to negligent, indifferent or reckless employees, can be eliminated, our duty is clear; and it is also apparent that unless railway managers encourage activity along the lines of reducing train accidents by trying out all new devices promising results and by adopting those found to be practical, public opinion, which is all powerful when concentrated and directed, will call for and be granted a new deal, and in connection with which parsimonious or short sighted managements will be relegated to the discard.

We also need a further extension of your efforts in the field of train despatching. As a train despatcher of many years experience I have dreamed for years of a railway line equipped with signals under the direct control of the despatcher, so arranged that trains of whatever class may be handled by signals alone, eliminating the cumbersome, delay-producing train order entirely. The despatcher must know by return indication or otherwise that when he desires a given signal in a given position and presses the button for that purpose there will be no doubt as to the results. Under such an installation much of the present day installation in the way of block signals, train order signals and telegraph operators may be dispensed with and the despatcher may be depended upon to keep his trains properly spaced.

We have mentioned but two railway necessities for you to work on. There are, as you are aware, many others, but the problem of reducing casualties in railway operation will receive a great impetus when, as is sure to occur, the perfection of the devices mentioned is accomplished.

The human race is affected with speed mania. Whatever causes may have operated to produce this condition are not pertinent now. What we must do is to throw around the traveling public such safeguards as will preserve their lives and limbs until the disease runs its course.

This disease is reflected in the train schedules, both passenger and freight, but more especially in passenger service. A mere glance at a schedule does not indicate at what speed a local train must be run between stations to enable it to reach the next station, do the work and leave on scheduled time. Many local passenger trains make faster time between stations than through trains making few or no stops.

Double tracking decreases the risks some, but not by 50 per cent. as some might think. Additional tracks with the necessity for improvements produce additional chances for accidents which must be protected against. High and low speed passenger traffic with high and low speed freight traffic performed on the same track, even on a double-tracked line, presents problems in the way of protection that are difficult of solution.

To the electrical engineers we are greatly indebted for the prompt manner in which you have responded to our call for assistance in providing this protection. Ours is the task of educating the employee to so regard those precautions as to avoid accidents and injuries. The field is large and the laborers are few, but the reward is ample, and we therefore request your co-operation in this crusade for the betterment of mankind.

RECONSTRUCTION OF THE CANADIAN PACIFIC BRIDGE OVER THE ST. LAWRENCE.

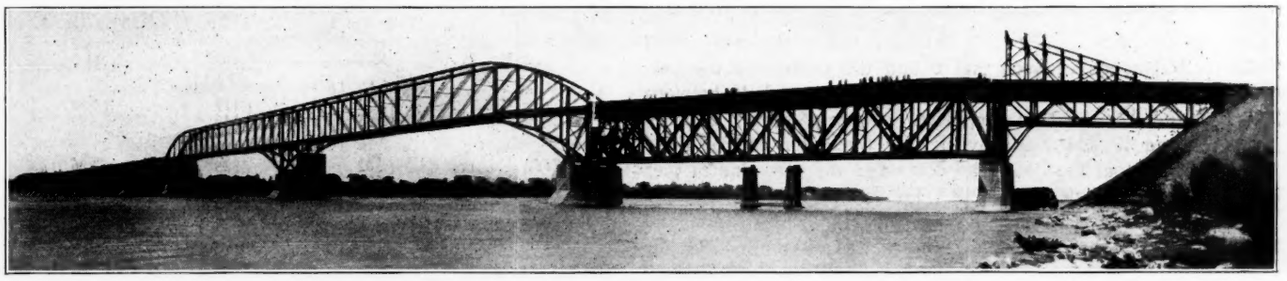
The Canadian Pacific has about completed the double-tracking of its main line from Montreal east to Farnham. The traffic on this line has greatly increased, particularly near the Montreal end, where the line is used by the St. Lawrence & Adirondack and the Rutland, until there are now from 60 to 70 trains daily. The work consists largely in widening existing cuts and fills and replacing small bridges, the principal feature of the work being the reconstruction of the St. Lawrence river bridge between Highlands and Caughnawaga, about 8 miles from the terminal in Montreal. In addition to adding the second track, this bridge is being completely renewed in order to strengthen it for the heavier power which is now being operated over the line. The old bridge was built in 1886, one year after the completion of the Transcontinental line, and while at that time it was considered an example of advanced bridge design and has carried the traffic up to the present time, the weight of rolling stock has so increased that it is necessary to provide a structure of heavier design.

The old bridge consisted of 16 spans with the following lengths measured from the Highlands end: Three deck girders 80 ft. long; eight deck trusses 240 ft. long; a flanking span 270 ft. long; two cantilever channel spans each 408 ft. long, a flanking span 270 ft. long, and one 120-ft. deck truss span. As the water is not deep under the approach on the Highlands side it was decided to shorten four of the approach spans by inserting four new piers, the saving in steel on account of the decreased span length more than offsetting the cost of the piers. The new bridge consists of three 80-ft. deck girders, eight 120-ft. deck trusses, four 240-ft. deck trusses, one 270-ft. deck truss, two 408-ft. through trusses, one 270-ft. deck truss, and one 120-ft. deck truss span. About 14,000 tons of steel were required.

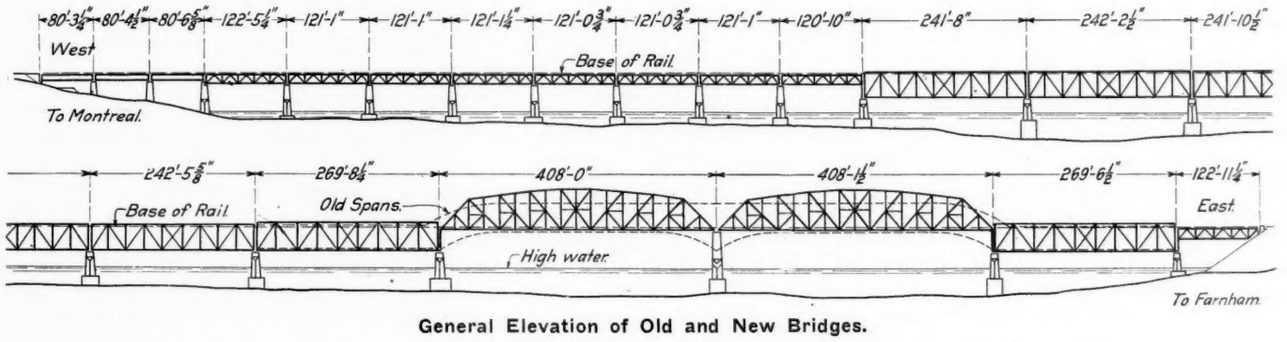
One of the interesting features of the reconstruction was the pier work. The bridge is located at the upper end of the Lachine rapids, and the current at the bridge site varies from eight to ten miles an hour, with even higher velocities when the ice is

running in the spring. For this reason special care had to be taken in the work below water, and to minimize the trouble the additions to the old pier were placed on the down stream side. The open cofferdam method was used for building the four new piers and for placing the additions to the old ones out to pier No. 7. The old piers had been built of Montreal limestone and as borings taken with air drills before the beginning of the work showed that this substructure was in excellent condition it was decided to use the old pier and build the additions of the same material above the water line, the footings being of concrete. The cofferdams for the eleven piers in shallow water were made by driving piling around the old piers and calking the joints with clay. Work was begun in the fall of 1910, a light trestle being built out from the Highlands shore to pier No. 7, from which work above the water line was carried on. This trestle was supported on crib work, but when winter stopped the work, the trestle deck was removed and the ice in the spring was allowed to carry away these cribs. For the work of the next season trestle bents were placed directly on the river bottom. Very little difficulty was experienced from the current in this shallow portion of the river.

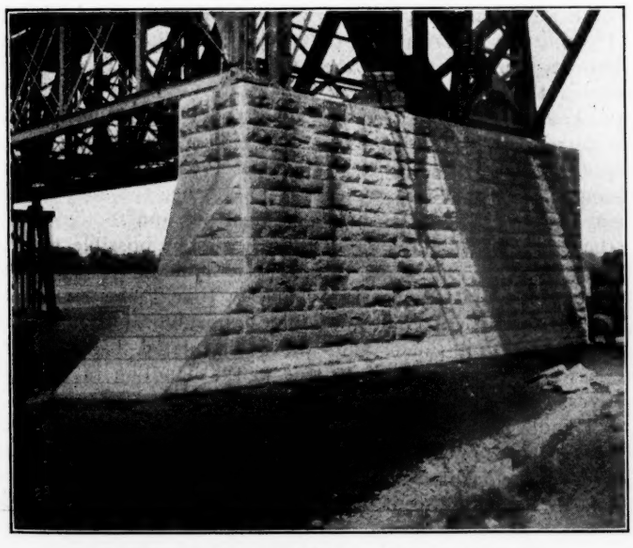
For enlarging the piers in deep water pneumatic caissons, which were square on one end and pointed on the other at the same angle as the pier nose, were sunk on the down stream side of the old piers, with the square end as close to the nose of the old pier as it was possible to drive it. These caissons were sunk through about 12 ft. of overburden, consisting of gravel and boulders, to rock at an elevation about 30 ft. below water line. Pile cofferdams were driven alongside this caisson and the old pier and the joints were well calked. Divers were sent down to remove the material in the corners between the caisson and the old pier nose, the outer section was removed through the caisson, the whole footing was pumped dry and the concrete placed. This concrete was reinforced by rods bonded into the old footing. The old starling was cut down to the concrete footing 3 or 4 ft. below the water line and the new



Panorama of St. Lawrence River Bridge During Reconstruction.



General Elevation of Old and New Bridges.



Typical Pier Extended for Second Track.

Deck of New Span.

stone bonded to the old pier by a course of I-beams inserted in the old pier. A floating plant was used for the construction of these deep water piers.

The erection of steel was begun at the Highlands end, and by working from the old bridge the new spans for the second track east of the old track were placed out to pier No. 7. By sliding the old 240-ft. span and the two new 120-ft. spans between piers 6 and 7 it was possible to place a crossover about at pier 6 and turn the traffic over the new east track from that point to the shore. The old structure under the west track was then removed between pier 6 and the shore and the new superstructure placed. The erection of the east half between piers 7 and 12 was then completed and a crossover between piers 11 and 12 was made by slewing the outer end of these two spans so that the new span connected the east side of pier 11 with the west side of pier 12. Traffic was then turned over the east track between pier 12 and the Highlands shore, and the old structure between piers 7 and 12 was dismantled and the new spans were placed. The approach span on the Caughnawaga side between piers 14 and 15 was completed about the same time as the eastern spans between piers 7 and 12, and when traffic was turned over the west track between pier 12 and the Highlands shore the new through truss channel spans for the east track were erected over the deck approaches on either side. The work had reached this stage when the accompanying photographs were taken. These channel spans will be pushed out to place by mounting the back ends on rollers so they can slide over the approach spans, the front ends being carried on scows floating in the river. When these spans are in position, traffic will be turned over this track for the entire length of the bridge, while the south approach span and two channel spans on the west track are placed. It is expected that this work will require several months to complete.

The Foundation Company of New York had the contract for building the piers and supplied the equipment necessary for the work on the deep water piers. The railway company furnished the equipment for the piers in shallow water and handled the work by company forces. The Dominion Bridge Company fabricated and erected the steel superstructure, and as this company's works are located within a short distance of the bridge it was not necessary to establish a field shop. The design of the new bridge was made under the direction of P. B. Motley, engineer of bridges, and the construction work was under the charge of J. H. Barber.

FUEL ECONOMY ON THE BUFFALO, ROCHESTER & PITTSBURGH.

The Buffalo, Rochester & Pittsburgh has recently issued a bulletin on fuel economy from the general manager's office to all concerned in the movement and care of locomotives, from which the following is taken:

The possibilities for engine crews effecting a material reduction in the fuel expense and the enormous loss in fuel consumed at terminals is made strikingly evident from the following tests.

A recent test was conducted at DuBois, Pa., with engine 360 to determine in a practical manner the loss incurred when pop valves are open, with the following results: With the fire controlled so that steam pressure was maintained slightly below the popping point, 3.33 lbs. of coal were required per minute. With the fire controlled so that one muffled pop valve was kept open moderately, 8.8 lbs. of coal were required per minute. With the fire controlled so that one muffled and one open pop valve were kept open, 31.1 lbs. of coal were required per minute. There was thus a loss of 5.5 lbs. of coal per minute due to one muffled pop valve being open moderately and a loss of 27.8 lbs. of coal per minute when the pressure was increased so that two pop valves were kept open. Averaging these results, the loss incurred while maximum allowable pressure was exceeded, may safely be said to be 16.6 lbs. of coal per minute.

A recent test on the Buffalo division demonstrated emphatically the possibility for economy in fuel. Two crews handled engine 302 with a full tonnage single train, three round trips each from East Salamanca to Buffalo Creek and return, with the following results:

	Trip No. 1.	Trip No. 2.	Trip No. 3.
Miles Run Per Ton Coal Used on Road.			
Crew No. 1..	14.7	16.0	18.2
Crew No. 2..	15.6	18.7	21.0
Tons in Train Northbound.			
Crew No. 1..	1,073	1,117	1,124
Crew No. 2..	1,165	1,146	1,183
Tons in Train Southbound.			
Crew No. 1..	502	529	526
Crew No. 2..	506	500	518.5
Time on Road—Round Trip.			
Crew No. 1..	10 hrs. 27 min.	10 hrs. 20 min.	10 hrs. 40 min.
Crew No. 2..	10 hrs. 35 min.	10 hrs. 5 min.	10 hrs. 20 min.

The great improvement shown by both crews was without doubt due to the interest taken by them in their work. The better performance of crew No. 2 was due to special care on their part, it being a fact worthy of much consideration that they did not allow the pop valves to open during the entire time consumed in making the three round trips, and no boiler work was required during or between the test runs.

	Trips. 1 and 2.	2 and 3.	3 and 4.	4 and 5.	5 and 6.
Time at East Salamanca between trips	14 hrs.	14 hrs.	60 hrs.	18 hrs.	13 hrs. 20 min.
Coal consumed at East Salamanca Terminal.	3,240 lbs.	3,255 lbs.	5,700 lbs.	4,680 lbs.	3,240 lbs.
Per cent. coal consumed at East Salamanca to total coal consumed	16.9	18.1	27.6	27.0	22.3

Employees directly in charge of the maintenance and handling of locomotives are advised that one of the greatest opportunities for promoting the company's and indirectly their own welfare is afforded by the possibilities for reduction of fuel expense. It is essential that all employees appreciate fully their responsibilities and a brief synopsis of the duties of various employees, as discussed by the speakers at meetings held recently at several of the important terminals, is given below.

ENGINEERS.

Use steam as expansively as possible; this applies to engineers handling switch engines as well as road engineers. Handle the reverse lever and throttle so as not to partially destroy the fire and thwart the firemen's efforts. Courteously advise the firemen relative to the proposed method of handling the engine and as to the best method of performing his duties under the varying conditions, and insist on conformity with the most economical practices. Promptly and repeatedly, if necessary, report the condition of engines which affect unfavorably the economy in fuel. Control the water supply in the boiler so that when approaching localities where long stops are to be made or the engine is to drift for a considerable distance the body of the fire may be allowed to partially burn out and so that while the engine is standing or drifting it will be possible to prevent a waste of steam through the pop valves. Do not force an engine unnecessarily at any time. The movement of business is, of course, of first importance but it is well known that ill-timed and poorly regulated haste makes waste. This is particularly true in the handling of locomotives.

Handle the air brake apparatus properly, avoiding stuck brakes and unnecessary work for the air pump. When approaching localities where stops or slow downs are to be made, avoid the use of brakes and allow frictional and grade resistence to sufficiently reduce the speed of the train when consistent to do so. See that all bearing surfaces are prop-

erly lubricated. When handling superheater locomotives, observe regularly the special instructions, particularly as regards the avoidance of burning the oil in the cylinders and valve chambers. Use a wide open throttle and as short a cut-off as possible in order to kep the superheater pipes tully charged with steam, insuring the highest degree of superheat in the steam entering the cylinders and the opportunity for the superheat to cause greater expansion, thus performing much more work than is possible with saturated or mildly superheated steam, or with highly superheated steam when used with a longer cut-off and a light throttle.

Engineers should make recommendations relative to minor changes in schedules which, if made effective, will result in a decrease in fuel expense, and should always report inferior fuel whether or not such fuel causes an engine failure. Do not hesitate to request information from officials. Invite and carefully consider suggestions from your firemen.

FIREMEN.

Prepare for the hard pull before, but not long before, reaching it; usually with the boiler well filled with water firemen can build up the fire as the hard work begins. Your energy, as well as the energy which the coal contains, if blown out of the pop valve, is a total loss which affects adversely both you and the company. Don't shake fire into the ash pan; it does no good and much harm. Don't shake ashes into the ash pan just prior to drifting; the ashes if allowed to remain in the firebox will obstruct the draft through the fire and help to avoid waste through the pop valve. Let the fire burn down approaching points where long stops are to be made or where the engine will be allowed to drift; while standing or drifting the fire next the flue sheet should be banked.

Avoid black smoke and maintain a high firebox temperature while the engine is working by frequent but light firing. Don't use more than three shovels full per "fire," keeping the fire distributed over the entire grate surface. Don't throw large lumps of coal into the firebox—small pieces burn rapidly and more thoroughly, generating intense heat. Black smoke accompanied by an open pop valve indicates deplorable mismanagement and frequently causes failure to observe signals and great discomfort to passengers. It is often profitable to use the injector as a feed water heater in preparation for hard work and to avoid popping. Remember that nearly all, if not all, the coal in the firebox when the engine arrives at the terminal is wasted, and arrange to have as little fire on the grates as is necessary to protect the flues and firebox when the engine is delivered on the ash pit track. Seek advice and assistance from the engineer, road foreman of engines and master mechanic.

ENGINE DESPATCHERS AND HOSTLERS.

Don't keep engines under fire unnecessarily. Instruct and supervise the fire cleaners so that the greatest possible amount of fire will be saved while the refuse is being removed from the firebox and so that the least amount of coal will be used in maintaining the fire while the engine remains at the terminal. While a fire is being cleaned the blower must be used only hard enough to keep the gases from backing out the firebox door. When the blower is on full blast the induced current of cold air causes serious injury to the firebox sheets and flues. Don't hurry the building of fire in engines which have been ordered for service, after steam enough to move the engine has been generated. Don't prepare fire for road service before it is necessary to do so. Coal which falls through the grates into the ash pan while a new fire is being built must be removed and reclaimed for use before the engine is delivered to the engine crew. Efforts are being made to keep the fuel supply at a high standard and your inspection of this supply should be followed immediately by reports of all improper material furnished as fuel.

BOILERMAKERS AND MACHINISTS.

Stop leaky boiler, flue and packings, as well as leaks at checks, pops, whistles and other valves. Correct defects in draft appliances, grates and ash pans. Correct improper steam distribution (lame engines cause great fuel waste). Obviate lost motion—any movement of the pistons not accompanied by a turning of the drivers represents wasted energy and causes injury to the locomotive.

AGENTS AND OPERATORS.

It may not have occurred to you, but it is a fact that any mismanagement on your part, resulting in a delay of trains, will cause much waste of fuel. Your attention is called to the fact that for every minute an engine is delayed on the road 3.3 lbs. of coal are consumed. You are also advised that it is frequently impossible for engine crews to prevent waste of steam through pop valves when unexpected delays are lengthy, in which case the loss averages 16 lbs. of coal per minute per engine. Almost invariably delay to a passenger train results in a corresponding delay to several, sometimes twelve, freight, yard and work train engines, in which case for every minute of the delay, coal varying in amount from 40 to 200 lbs. is wasted; such waste is, in many cases, directly due to indifference or thoughtlessness on the part of agents and their staff.

Stopping trains unnecessarily is also costly. During a recent test run, a train consisting of a large engine and 57 loaded cars was stopped unnecessarily at the foot of a short grade up which the train would have drifted; six hundred pounds of coal were required to generate sufficient steam to move train to the top of the grade. Exceeding schedule speed is frequently accomplished at enormous fuel expense as was illustrated by tests on Buffalo division. On May 12 train No. 7 made schedule speed and was on time at all stations; on May 16 this train was delayed 8 minutes at stations but arrived at the terminal on time, the engine using two tons more coal than was required on May 12. In both cases the train consisted of the same cars and the same engine and was manned by the same crew, the coal being of similar quality in both instances.

TRAIN DESPATCHERS.

Read carefully the paragraphs under the heading "Agents and Operators." Your thorough co-operation is most essential in order that efforts to reduce the fuel expense may be successful. Your responsibilities in this important matter are perhaps greater than you have realized, and your careful investigation of engine delays, followed by the adoption of plans for reduction of the incidental expense, is required.

TRAIN AND YARD CONDUCTORS.

To move cars with "stuck" brakes results in much waste of fuel. When the handling of local, work train or yard movements is such that a delay to a through train results, considerable fuel loss is incurred and the local, work train or yard work is usually more seriously delayed than would have been the case had the through train been allowed to move out of the way quickly. Your efforts in the avoidance of all delays will effect the use of fuel most favorably.

Railway Concessions in Venezuela.—To obtain a railway concession in Venezuela a contract must be made with the president of the republic, which contract is subject to the approval of the federal congress before it becomes binding on the parties thereto. This contract must specify the date on which railway construction is to be commenced, and the date the railway is to be completed and opened to traffic. A deposit must be made by the concessionaire in the public treasury equal to $6.25 per mile of railway, and a further deposit, the amount of which is to be determined by the federal executive. Unless special arrangements shall be made to the contrary all Venezuelan railways shall have a gage of 3 ft. 6 in.

THE PROTECTION OF RAILWAY EMBANKMENTS.

A Description of Methods Adopted by Different Roads to Prevent Damage to Fills by Standing or Flowing Water.

By A. M. Van Auken,
Formerly Chief Engineer, Memphis, Dallas & Gulf.

One of the most insidious dangers to a railway roadbed is water, and it threatens it in a number of ways. The first is the stagnant water which does its damage by so softening the soil on which the roadbed is built as to cause settlements and slides in the supporting soil and subsidence of the roadbed. In the second class may be considered the stagnant water alongside the road which lies in such considerable bodies that it may be agitated by winds, and on which ice may form, which in turn may be forced against the roadbed and structures by the winds, and do even greater damage than is done by the wash of the waves. The third form is the water flowing with greater or less velocity in defined channels subject to periodical fluctuations as to quantity.

SOFTENING OF EMBANKMENTS.

The first class does most of its damage where the land across which the road is located is what is "made land," or land which has been created through the deposit of sediment along low lying lands and former water ways in the vicinity of rivers or other bodies of water. The most common locations for such trouble are near the delta of tidal rivers, although the same conditions are encountered along our lakes and along the Mississippi river and its tributaries below the Ohio. In one instance, on the Iron Mountain road between Bald Knob and Memphis, where a long trestle has been filled in, the subsidence of the filling has amounted to over 60 ft. and the thrust effect of the fill has overturned quite large trees at a distance from

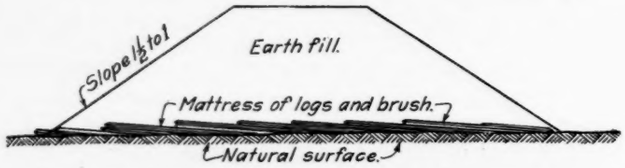


Fig. 1—Mattress of Logs Underneath an Embankment.

the roadway. There seems to be no entirely satisfactory way to treat such a problem, but whatever will add to the cohesion of the supporting earth will help. A mattress of logs and brush similar to that shown in Fig. 1 and described in standard specifications will often give protection. It is well to make an estimate of the weight which must be supported by the soil, and then construct a mattress or other support which will make the foundation sufficiently strong to support this load. In some instances it might be well to have the mat extend a little beyond the toe of slope, or better still, build the bank with slopes of 2 to 1 up to a point above high water. One must bear in mind that even water will carry a certain load and build a foundation which will restrain the roadbed material from separating in the water and losing its cohesiveness. The material being deposited must be prevented from intermixing with the subsoil, and becoming like it. No general rule can be laid down to meet all cases, for water is elusive and one must adapt his means to accomplish his ends.

WAVE AND ICE ACTION.

In the second class are the roadbeds along the lakes, ponds and other bodies of water. The dangers are of two classes, the wash of the waves when the water is agitated by winds, and the danger from debris washed against it. This latter includes ice, which may be in small bodies and do damage through cutting, or which may move in large areas called "shoves" along our Northern lakes. Where the damage to be guarded against is from wave action, anything which will break up the wave, or resist its destructive power, will accomplish the end sought.

There are many ways of accomplishing this where the body of water is not large or the sweep down which the waves come long. A simple method is to riprap the slope of the bank with stone heavy enough to resist the power of the waves to pull back when they recede. Where stone is not available, or is unduly expensive, the same end can be accomplished, if space is available, by making the slope five horizontal to one perpendicular. This is the slope to which the wave action pulls a beach, and is the method which protects much of the dikes which hold back the North sea in Holland. Willows and other

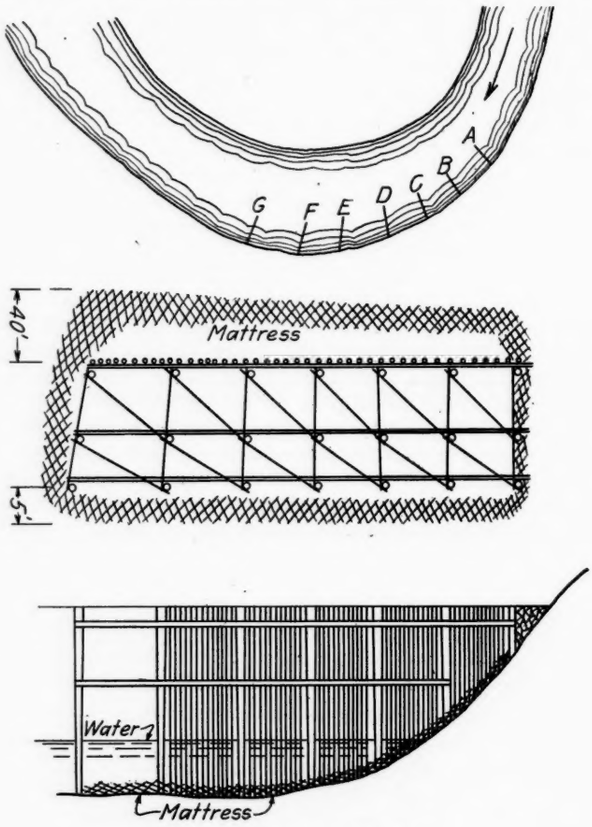


Fig. 2—Permeable Pile Dike.

sturdy growing brush will help to hold against winds if planted along it, and a Bermuda grass sod will greatly add to its resistance above the water edge.

A structure of piling or piers placed at a distance from the track will obstruct the waves and prevent damage. Often a simple row of piling placed parallel to the tracks will accomplish this. The same result can be accomplished by a dike made of brush weighted down with stone. In using a dike it should not be built quite to the surface of the water. It will be just as effective in breaking the waves, and the brush under water will not be so subject to decay. Anything which will offer an obstruction to the roll of the wave sufficient to reduce its velocity below the point where it will wash the bank will give protection.

When the body of water to be protected against is like our

Great Lakes, the Gulf, or one of the oceans, the means to effectively protect against wave action are both difficult to design and expensive to construct and maintain. The writer has seen cut stone of over a cubic yard in size displaced by waves from a storm on Lake Superior, at Marquette, Mich., and has seen heavy masonry damaged at other points. Houses, well built, of ten or more rooms have been cut in two by shoves of ice when they stood 300 ft. from the normal shore line of the lake. Ice several feet thick pushed by great bodies of ice and water behind it has an almost irresistible power. The cost of protecting against these last conditions is so great that it is seldom economy to do it, but it is usually cheaper to change the location of the line. A wave 20 ft. high and 100 ft. long contains over 60 tons of water per foot of face. Dash this weight against an obstruction at a speed of eight feet per second, and it will have a very destructive effect.

ACTION OF FLOWING WATER.

The last class is the water flowing in defined channels. This does damage in several ways. Trouble may arise from a culvert, pipe or bridge being too small to carry the volume of water or it may be that owing to the location of the opening the water will not strike it fairly, or it may be from water running parallel to the track, or approximately so. Many washouts would be saved if engineers were more willing to let water have its way. It often happens that in order to save a few yards of earthwork they will carry a stream alongside the embankment

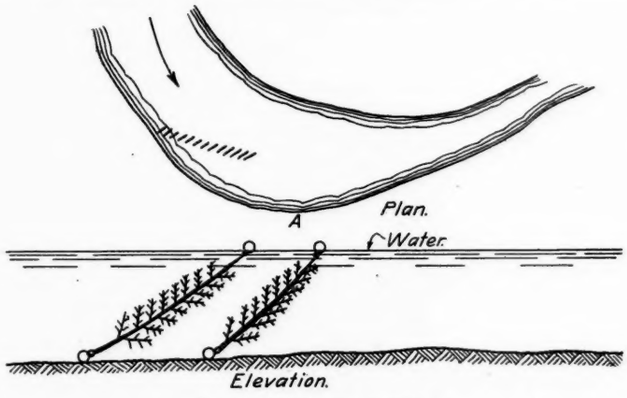


Fig. 3—"Fox Tail" Dike.

for a distance before letting it pass through. In flood time the excess water is precipitated against the embankment with damage to it. If the engineer will picture in his mind the action of the stream in flood time, and so place his opening as to offer the smallest obstruction to the flow of the water, he will usually secure the best location.

The protection of bridge and culvert ends and banks where the stream runs approximately parallel to the roadbed is simplified where the bed of the stream is of rock, or other material offering great resistance to wash. All that is then necessary is to protect the banks with stone riprap, using the best material available. This may be any sort of material of such specific gravity that its weight will overcome the power of running water to move it. The ordinary quarry run of stone is most common, but brickbats and rubbish from wrecked buildings, refuse from slate quarries and slag from blast furnaces is often used. The velocity and size of the stream and the probability of ice must be considered. When spring comes, the waters rise in the streams. The shore ice is last to melt, and is often lifted by the rising waters, raising with it anything to which it may be attached which has not sufficient weight to cause it to break the hold of the ice. In some regions it is necessary to use stones so large as to require a derrick to handle them in order to ensure protection.

The problem is made more difficult where the bed of the stream is of a sandy nature, for there the water will wash the sand from under the riprap and it will settle out of sight, leaving the bank unprotected. Along the Wisconsin, upper Mississippi and similar streams this difficulty has been overcome by first laying a mat or layer of brush in such a way that the brush interlaces and forms a base, and then depositing the stone on this. The tougher the brush is the better it is for this class of work. Poplars and pine, being most frail and perishable, have the least value. There seems to be little difference in value between deciduous and evergreen trees for this use, as the limbs and twigs are what give the value, the leaves soon being lost.

Each locality possesses its own problems. Each should be most carefully studied by the engineer. It often happens that a protection built at some other point at a distance from the danger will so alter the course of the stream as to make the place threatened perfectly safe for all time. No set rules can be given. The danger may come from the wearing away of a point up the stream. The protecting of this point may for all time remove danger. On the lower reaches of our alluvial streams, such as the Missouri, lower Mississippi, Arkansas and Red there is a continual change occurring in the stream. Taking almost any stretch of either stream, one will find that for some distance it has almost no banks, and the rising water in flood times spreads out over wide stretches of country. A short distance below the stream will be confined by natural bluffs or levees to a much narrower channel. If the volume of the stream is quadrupled it will deepen it some three times in the narrow stretch, while just below it will spread it out over the country and only raise the water level one-fourth. In this way the slope of the river is increased abnormally at the point where these two sections join. The energy of the river will be at once directed to remedy this condition, the current becomes more rapid in the narrow part, and the bottom of the river is scoured to increase the channel where it cannot increase in width.

When the water subsides, the reverse occurs. Each foot of fall in the narrow and deep part causes a narrowing of the wide section, reducing its discharge much more than the other, causing it to scour out a channel. As water follows the line of least resistance, the new channel winds about obstructions and may be far from where the channel was originally. As the current now has a greater velocity in the wide and shallow section than in the narrow and deep one, the energy of the river is bent on scouring out the former and depositing in the latter. Whether this ever-recurring condition will ever be remedied remains to be seen. As it is each rise and fall of the river sees great destruction. If we are to protect our roadbeds in these places we must place in the way of the changes in channel an obstruction which will turn the current of the water from the point of danger to our works. The volume of water is so great and the resisting action of the soil so slight that we must to an unusual degree supplement its resistance. Riprap is useless; it will settle out of sight and disappear almost as fast as placed. The brush and stone protection, so successful on the Wisconsin, are useless here.

The danger usually is greatest at the outside of the bends; the force of the current continually cuts away at these points, and often finally makes a cut-off, shortening the stream, and at that point increasing its slope, causing endless damage further down the stream as the river seeks to regulate itself. There seem but two methods which will successfully control these streams. The first and most successful of these is the woven mattress, weighted with stone. It is expensive in first cost, and needs some attention each year, to see that no damage from the elements or vandals has weakened it or that changing conditions of the river have not created some new danger to it; but given this slight attention it has never failed to give perfect protection.

In protecting a bank with a mattress, it is first necessary to grade the bank to a slope ranging usually from two horizontal to one perpendicular, to three horizontal to one perpendicular, depending on the nature of the soil and the kind of stone used for the paving. A mattress is woven from brush and poles

interwoven with wire, or with cypress boards and wire, depending on the supply and cost of the brush. The sole use of the mat is to form a foundation to prevent the stone from sinking out of sight, and to prevent the current from cutting into the bank. The mattress must extend out to and beyond the thalweg of the stream to prevent the current from working under its edge and destroying it. From low water to high water the bank is paved with the best stone available, laid much the reverse of the way shingles are laid in roofing a house.

The second method, illustrated in Fig. 2, is the permeable pile dike. It is of lower first cost, demands annual attention and requires renewal every six or eight years. The first dike must be placed where the current strikes the bank, and the others so close to it that no eddy will form between them. These dikes consist of two, three or four rows of piling, as may be needed to resist the force of the current and debris carried. The piles are driven about 10 ft. apart in each direction, and the bottom of the stream is covered with a mattress extending about 40 ft. up stream, and five feet below the dike and woven into it. Piles are braced laterally, longitudinally and diagonally, and along the upper row a row of poles is spiked to stringers much as are pickets on a fence. These break the force of the current and catch the drift, building up a sandbar behind them. The shore end of each dike must be protected by stone above low water. They do not last long, but the first cost is less than the mattress. On the Missouri the cost of the mattress was $10 per foot of bank protected and the dike about $4.50 per ft.

Fig. 3 illustrates what were called "Fox Tail dikes" which were much used on the Missouri in the seventies. The dikes are started up stream above the danger point, and are anchored in such a way as to form a dike, gradually deflecting the current. The "Fox Tail" is made by taking saplings somewhat longer than the depth of the water where they are to be planted. If the trees are not sufficiently bushy, brush is spiked to them. A large stone is attached to the lower end and a barrel or float to the upper end. Unless a float is used the tail is soon weighted down with sediment and loses its floating power. It is necessary to test the stream a little to determine the best slope to have the tail hung at. These dikes have almost no value as a permanent protection, but for a temporary protection in an emergency they can be used in high water to deflect the current, and if one fails it can be replaced.

DRIFTING OF SUPERHEATER LOCOMOTIVES.—It is desirable to have a certain amount of steam used in the cylinders of superheater locomotives when they are drifting and instructions are in effect on several roads that the steam must not be shut off entirely under these conditions. J. E. Osmer, master mechanic of the Chicago & North Western, has developed a device which is used on the West Iowa division to call the engineer's attention to the fact that the steam has been shut off entirely while the locomotive is drifting. This is accomplished by tapping a small pipe into a back cylinder head on one side of the locomotive, to which is attached a small check valve seated against the steam pressure in the cylinder. A small pipe extends to the cab, at the end of which a double disc tin whistle is applied. When steam is used in the cylinder the check is seated, but if it is shut off while in motion, which is contrary to instructions, a vacuum is created in the pipe, unseating the check valve and drawing air through the disc whistle. The engineer immediately opens the throttle far enough to break the vacuum in the cylinder. This amount of steam will aid greatly in lubricating the valves and cylinder packing, consequently reducing the wear on them. Another means of bringing about the same result is as follows: A T connection, where the oil pipe, tapped into the center of the cylinder connects to the lubricator, contains an upward seated valve. This is held against its seat when steam is worked, but if a vacuum is created it will sound a disc whistle. In this particular construction there is no check valve between the lubricator and the cylinder. Both of these devices have worked out successfully.

THE PROPOSED SEE AMERICA FIRST ASSOCIATION.*

BY E. L. BEVINGTON,
Secretary Trans-Continental Passenger Association.

It is said that the slogan "See America First" was coined by Governor Adams of Colorado in an article published in *Harper's Weekly* in refutation of a slur upon the west which had previously appeared in that publication. Governor Adams concluded his article with the phrase, "See Europe if you will, but see America first."

The possibilities suggested by this slogan were extensively discussed in various meetings in the West, resulting in the formation of the See America First League in Salt Lake City, in January, 1906. Sporadic attempts were afterwards made in other parts of the country to formulate plans which would give a well sustained impetus to the movement, but the desired success was not attained, obviously for the reasons that, first, they were sporadic; second, they were sectionalized, and third, participation was more or less restricted and sufficient enthusiasm was not aroused among the great variety of powerful interests that would have benefited, directly or indirectly, from increased passenger traffic.

At a dinner given by one of the transcontinental lines at the Grand Pacific Hotel, Chicago, on May 28 last, some still and moving pictures of western scenery in beautiful colorings were exhibited, and the enthusiasm created thereby found response in a decision to revive the slumbering slogan "See America First" and to adopt ways and means to propagate it with the view of encouraging and increasing American travel. C. W. Pitts of the Great Northern and the speaker were appointed a committee to make the initial arrangements. Soon thereafter, a mass meeting of the Chicago terminal lines and the resident representatives of other lines was called to discuss the matter. At that meeting a temporary board of managers was appointed and at a meeting of the board held July 9, resolutions were adopted in part as follows:

Resolved, That after giving the subject due consideration and thought, it is the sense of this committee that the proposition to form a permanent organization to be known as the "See America First Association," whose membership shall consist of all carriers, both rail and water, chambers of commerce, boards of trade, civic organizations, hotels and hotel organizations, trans-Atlantic and trans-Pacific carriers and others interested in the "See America First" idea, is practicable; and with the view of ascertaining the sentiment and the co-operation which will be extended by the various interests, Temporary Chairman Bevington be empowered to call a mass meeting in Chicago upon a suitable date in October, 1912.

The ways and means committee of the Chicago Association of Commerce adopted a most favorable resolution pledging its co-operation and providing for the appointment of a committee to assist the members of the board of the See America First Association in arranging for the national convention to be held in Chicago in November next.

The Trans-Mississippi Commercial Congress has expressed itself in the strongest possible terms in favor of the movement, and during its session, addresses on the subject were made by Louis W. Hill, chairman of the board of directors of the Great Northern; J. W. Kelley of Denver, and others, in furtherance of the idea. A resolution requesting President Taft to issue a proclamation this year and each succeeding year, designating a date as a national "See America First Day," met with instant favor. The resolution sets forth that on such occasion the subject be discussed in the pulpits of the churches, the press, public schools and by civic, commercial, patriotic and fraternal organizations throughout America.

At first blush, the proposition appears to be so vast and intangible, and the ramifications so varied and extensive, that a working, practical organization, established on scientific lines and business principles, appears to be almost chimerical, but those who have carefully studied the matter do not believe this to be true. On the contrary, they are convinced that a plan can be

*Abstract of an address before the meeting of the American Association of General Passenger and Ticket Agents, at Seattle, Wash., September 12.

devised to put such an organization as proposed upon a sure footing, and through its instrumentality appreciably increase passenger traffic through the enlistment of the financial, moral and personal support of many who, today, directly or indirectly, benefit from passenger travel, but who do not contribute their full share of money and personal effort towards its production. As is well known, tourist traffic is largely of a creative character. In a general way it fluctuates in exact ratio to the efficacy and power of the means used to produce and control it. There could be nothing extraordinary or unbusinesslike about a plan to form an organization having for its object the unification of the several interests, whose aims and objects are identical, that they may work concertedly and abreast, pursuant to well-defined and approved plans, instead of apart and more or less haphazardly.

Mr. Hill has suggested that the national government should help. This being a question which affects the common weal, why should not the national government assist? Also the state governments, the hundreds of commercial bodies, and hotel organizations whose constituencies are materially benefited by passenger traffic and whose interests lie directly in having that traffic increased.

It has been said that this question has been threshed out in connection with immigration and in other ways, and that the states and their commercial bodies have withheld co-operation. In rebuttal we say that the record does not show that the efficiency of a big, broad-gaged, properly constituted and duly accredited national organization, with officers, committees and membership drafted from the ranks of the very men who assist in framing public opinion and in deciding questions of state, has ever been tested.

As temporary chairman, the speaker has been deluged with voluntary offers of substantial support from all sides and there have been but comparatively few discordant notes.

Some one has said: "I would not care to contribute to a general fund which might be expended promiscuously on something in which my company is not interested." Such a thing is not contemplated. The plan would be to have the contributor indicate the precise purpose for which he desires his money to be expended. Contributions would be received from railways, chambers of commerce, boards of trade, civic organizations and individuals; and from the federal government, states, counties, cities and resorts. All appropriations would be used for the purposes and precisely in the manner indicated by those making them. For example, an appropriation of $1,000 from a railway or other source, would be divided and set over into the following advertising accounts upon request of the donor: (a) Colorado, generally, $250.00; (b) Denver, $100.00; (c) California, $250.00; (d) Michigan resorts, in season, $200.00; (e) homeseekers fares (to specified territory), $200.00.

Similarly, a contribution from an eastern interest would, if so indicated, be used exclusively in advertising the attractions of New York state and the St. Lawrence river resorts. Upon receiving this explanation of the plan a gentleman said: "In what way would I be benefited? Why should I not retain my money and spend it in my own way in advertising my own resorts?" The answer is, an organization as big and powerful as the one proposed would engender confidence; it would promote publicity in many ways not now available owing to lack of organization; it would solicit and receive contributions from sources which do not now contribute a dollar; it would develop novel means of advertising; it would have lecture and moving picture departments; it would closely follow well defined plans of introducing scenic text books into public schools; it would have a corps of descriptive writers who would devote their time to exploiting American scenic attractions in the magazines and newspapers; it would form travel clubs and societies; it would establish a European branch for the purpose of developing traffic from Europe to America; it would extend these branches to other foreign countries as occasion might require; and do an endless number of things which discussion and experience might suggest with the view of increasing travel generally. This would cost a vast sum of money, but would be but a tithe of the amount which is today being expended in advertising for the promotion of travel. And here it might be said that this plan would not interfere with existing arrangements for individual advertising. It would merely supplement that work.

The power for good of the proposed organization, if properly conceived and administered, would be practically unlimited. Its policy would not be to decry European travel but to promote American travel. No form of education is more inspirational than travel, but it has been well said that an American whose knowledge of America is limited to a single group of cities and adjacent states is as little an American as the Englishman is an Englishman who lives in Bloomsbury and never has seen Piccadilly; the Berliner, a German, who has never seen Essen or Chemnitz; the Frenchman, a patriot, who has never watched the looms of Lille or the docks of Toulon.

It has also been said that from the earliest Greek fabulists to the most exquisite work of Maeterlinck the moral has been set forth that the farseeker of happiness in distant lands wins his quest only when he returns and looks at home. The North American would therefore be urged to "see North America"—not necessarily first but at least to supplement appreciation of what is good in alien lands, remembering that the sum now spent annually by Americans abroad is vast enough to create a navy of sufficient strength to practically insure world-peace or to shift in this country's favor an adverse balance of trade.

It might be pertinent to ask how many Americans are familiar with the scenic beauties, natural phenomena, majesty and grandeur of those wonderlands of our republic, the eleven national parks, which have been dedicated by act of Congress for the benefit and enjoyment of the people, some of which Robert Louis Stevenson and Rudyard Kipling, two of the world's master word colorists, confessed their inability adequately to describe? In these great national playgrounds the imprint of divinity has been set in wonderful depression and relief; here are blended the Alps, the Pyrenees, the grandeur of Norwegian fjords, the sacred mountain of Japan and the sublimity of India's Himalayas.

How many are familiar with the two score national monuments under the administration of the secretary of the interior?

The world does not hold mountain scenery surpassing the Appalachian system in the east—the White mountains, Green mountains, Alleghenies and the Blue Ridge; the Rocky mountains in the middle west, where someone has said the world breaks in two; the Sierra Nevada and Cascade mountains in the extreme west and the Coast ranges close to the Pacific coast.

One of the greatest river systems in the world is formed by the Missouri-Mississippi with its affluents—the Yellowstone, Platte, Ohio, Arkansas and Red rivers. The Rhine is more than matched in delightful story by the wide sweeping Columbia. And what of the Hudson, the St. Lawrence and the Fraser?

Are Americans appreciative of the immense inland fresh water seas; of Great Salt Lake, and the thousands of smaller lakes which lie at their doors; of Niagara Falls, the greatest waterfall in the known world, described as "Nature in the majesty of liquid motion"; of the beauties of the Mohawk valley; the "Land of the Sky," the Sapphire country and the gorgeous southland?

Do they realize that the Atlantic, Pacific and Gulf coasts and the interior teem with resorts built especially for their comfort and enjoyment; that Southern California and Florida possess Rivieras which far surpass the beauty of the "golden coast" of Italy; that we have the great southwest and old Mexico, the land of brave romance filled with old-age charm, cradling the remains of a civilization, dead centuries before the advent of the Spanish conquistadors, from whence have sprung marvelous modern cities and a seething commercial activity; the northwestern states and Puget Sound country where abound some of Nature's greatest wonder-pieces; Canada and its unsurpassed mountain scenery, its lakes that are legion, its fertile prairies and great inland sea; Colorado and Utah, called the "Playground of America?" How many know that we have glaciers, one of which could envelop all of those of Europe; an extinct crater

in which Vesuvius might be buried a thousand feet; and innumerable other world-famed wonders into which nature has breathed a spirit of magic awe and beauty?

Europe has capitalized everything to allure the tourist, from the Rock of Gibraltar to its Parisian gaieties, and the question arises, Why should not America enter the Marathon and feature, on a big, broad scale, its wholesome Rose Shows and Golden Potlatches, its Carnivals of Nations, its Cherry and Blossom Festivals and its round-ups, its Mardi Gras and other festivals, its mountains, National Parks, Mammoth Caves, majestic rivers, myriad islands, fertile valleys, giant trees, resorts, gorges, canyons, waterfalls, cataracts, glaciers, ice cliffs, terraces, domes, obelisks and buttes of fantastic shape?

The following figures speak for themselves: Europe has approximately three-fourths of the railway track mileage of the United States, yet in 1911 the passenger mileage of Europe was 72 billions against 32 billions in the United States. Making all due allowance for the greater density of population in Europe, should this great disparity exist?

It is fully appreciated and well understood that railways have individually expended millions in the exploitation of American scenery and other attractions, but has not the time come when those who have reaped but who have not sown should be urged to join in the campaign, and can such a movement find expression through a better instrumentality than the organization proposed, to the maintenance of which all who derive benefits from passenger traffic shall not only have opportunity, but shall be urged to contribute their share in money and personal effort? It would seem that in these days of harsh regulatory measures and ever increasing cost of things that enter into the construction and operation of railways, any important movement giving fair promise of increased revenues, without too great a risk, should be welcomed and fostered, but should the final verdict with respect to the movement and the plans here so inadequately outlined be adverse, or should it be decided that the time for launching the same is not propitious, it is suggested, in closing, that much good can be accomplished if the members of this association will adopt the slogan "See America First" in their advertising and other printed matter and through their agents and in other ways urge those engaged in other articles of trade and commerce to do the same. The benefits of such action will radiate, and many, in addition to the transportation lines, will be "caught in the ripples."

RAILWAY EARNINGS IN GERMANY.—Last July the gross earnings of the German railways averaged nearly 7 per cent. more than the year before.

FLANGE OILING SYSTEM.—One of the most serious difficulties encountered by the St. Clair Tunnel Company, which operates under the St. Clair river between Sarnia, Ontario, and Port Huron, Mich., has been excessive flange wear on the wheels of the electric locomotives. This is due to the fact that no leading or trailer trucks are used and the locomotives must pass through numerous sharp curves in the yards at each end of the tunnel. To eliminate this wear an ingenious flange oiling system has been installed, by means of which it is now possible to make over 50,000 miles between turnings. Previously when the locomotives, which are required to handle 1,000-ton trains on the two per cent. grades of the tunnel, were on the down grade, the application of the brakes made the tires so hot that grease could not be used. The apparatus that is now used sprays oil onto the flanges when they require lubricating. This is accomplished by pressing an electric button or an air valve. The tire is sprayed with oil and air and this both lubricates the flanges and cleans them from any dirt. For electric locomotives a single button operates the valve that supplies oil and air. For steam locomotives a small air valve of the push button type, located in a convenient position, operates the lubricating supply. The oil must be kept free from foreign substances and is thinned by the addition of a little coal oil in cold weather.

COMPARISON OF CHEMICAL CONSTITUENTS OF STEEL RAILS FROM 1870 TO DATE.

BY PAUL M. LA BACH,
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The subject of the chemical composition of rails has been given so much prominence in the discussion of the rail question during the past few months that the study of the specifications and analyses of rails rolled since the beginning of their manufacture in this country up to the present time will be instructive in view of the prevalent opinion that the better service claimed for the older rails has been due to their lower carbon content. The statement has frequently been put forth by the manufacturers—the most conspicuous being that of President Farrell of the Steel Corporation testifying before the Stanley Committee last winter—that the complaint regarding the inferior rails of the present day is due to the high percentage of carbon insisted upon by the railways. This claim has been strongly denied by the railway engineers. The following tabulation of the available data with reference to the chemical contents of rails rolled up to the present time was recently prepared in connection with an investigation of this subject, and is of interest because of the bearing it has upon this discussion. Much of this information was secured from the proceedings of the American Institute of Mining Engineers.

CONCLUSIONS.

The above comparison of specifications and the analyses shows:

1.—That the chemical constituents of the rail before 1890 are too irregular to justify an average being taken.

2.—That analyses were usually taken of failed rails and inferences drawn from them, when, as a matter of fact, there were large amounts of rail in track with the same and larger amounts of carbon doing good service at the time. Such few failures as are recorded show both soft and brittle rail.

3.—That the assumption that steel made in "the good old times" was any lower in carbon does not seem to be justified. It was simply more irregular, for the same weight of rails. As an example compare: (a) C. B. Dudley rails rolled in 1866-76, 57 lb. to 69 lb. Carbon .187 to .618, phosphorus .026 to .158, manganese .288 to 1.044. (b) Manufacturers' Standard, 1904, 50 to 70 lb. Carbon .35 to .48, phosphorus .10, manganese .70 to 1.00. (c) Rail analyzed by Dr. Dudley doing good service on outside of curve. Carbon .60, phosphorus .145, manganese .680. This last rail and a large percentage of those under (a) would not have been passed under the Pennsylvania Specification of 1876, or the Cambria "of about .4 carbon."

4.—That the truth of the matter is that both engineers (excepting a few) and manufacturers did not believe that the chemical constituents made much difference either way. The compliance with specifications, however, required greater uniformity and greater care. In so far as this tended to cut down output, it was objected to, but not because of high carbon in the rails. There does not seem to have been any effectual method instituted by the manufacturers to limit the carbon if we are to judge by analyses.

5.—That there are no complete statistics available from which to make a comparison with the 85-lb. to 100-lb. rail now in use with rail rolled previous to 1890. There was very little rail of this weight in service at that time, except some 85-lb. rail on one or two roads.

6.—That soft steel will involve the question of cold rolling, which was not so serious a question before 1890 as it is now with heavier wheel loads. Mr. Howard's tests at the Watertown arsenal show that cold rolling weakens the rail when the head is in tension; that is in the interval between wheels of locomotives.

7.—Mr. Farrell says: "The old soft rails, under the condi-

COMPARISON OF STEEL RAIL SPECIFICATIONS AND SOME ANALYSES OF OLD RAILS.

	Carbon.			Phosphorus.			Sulphur.			Manganese.			Silicon.		
	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max.	Av.
Rolled at Graz, Austria, previous to 1871	....	....	.38	....	....	....	....	....	.05	....	....	.07	....	....	.05†
Neuberg—hammered	....	....	.254	....	....	.044	....	....	....	....	....	.139	....	....	.033‡
13 John Brown rails	.24	.70	.382	.077	.098	.1215	.050	.133	.058	.512	1.046	.623	.052	.306	.103
John Brown rails reported by W. R. Jones, 1879, as in good condition after being in use 11 years	.026	.590	....	.104	.500	....	....	....	....	.774	1.079	....	.022	.187	....
*Penna. R. R. specification—															
Previous to 1878	.25	.35	...	....	.13	....	....	....	....	.40	.80	....	....	.04	....
After 1879	.30	.50	...												
C. B. Dudley's 1881 report on 64 57-lb.-69-lb. rails rolled 1866-76—															
1st 32 rails	.208	.618	....	.026	.158	....	....	....	....	.344	1.044	....	.018	.480	....
2nd 32 rails	.187	.548	....	.035	.145	....	....	....	....	.288	.870	....	.015	.181	....
From this data he selected 32 rails he considered best and averaged them	....	....	.334	....	....	.077	....	....	....	....	....	.491	....	....	.060
C. B. Dudley specincation	.25	.35	....	....	.10	....	....	....	....	.30	.40	....	....	.04	....
(Note—If he had used his own average results above, the carbon would have been .28 to .38.).															
(I)** Best wearing rails on outside of curves selected from 32 above	....	....	.600	....	....	.145	....	....	....	....	....	.680	....	....	.041
(II) Of these best wearing rails one sample showed	....	....	.460	....	....	.045	....	....	....	....	....	.406	....	....	.059
Penna. Steel Co., 1884	....	....	.4	....	....	....	....	....	....	....	....	....	....	....	....
Penna. R. R., 1885	.30	.50	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabash, *** March, 1886—															
70-lb.	.43	.51	...												
75-lb.	.45	.53	...	....	.085	....	....	....	....	....	....	....	0.1	....	....
80-lb.	.48	.56	...												
Q. & C., 1892, 75-lb	.42	.47	....	....	.10	....	....	.05	....	....	....	....	....	....	....
1893—P. H. Dudley (A. S. C. E. Proc.)—															
60-lb., 65-lb., 70-lb	.45	.55	...												
75-lb., 80-lb.	.50	.60	...	....	.06	....	....	.07	....	.80	1.00	....	.10	.15	....
100-lb.	.65	.75	...												
1895—R. W. Hunt****—															
70-lb.	.43	.51	....	....	.085	....	....	....	....	....	....	....	.10	....	....
75-lb.	.45	.53	....	....	.085	....	....	....	....	....	....	....	.10	....	....
80-lb.	.48	.56	....	....	.085	....	....	....	....	....	....	....	.10	....	....
90-lb.	.55	.63	....	....	.085	....	....	....	....	....	....	....	.10	....	....
100-lb.	.62	.70	....	....	.085	....	....	....	....	....	....	....	.10	....	....
1896—Mich Central, 80-lb.	.45	.55	....	....	.09	....	....	.07	....	.85	1.15	....	.10	.20	....
Illinois Central, 70-lb. and 75-lb	.45	.55	....	....	.075	....	....	....	....	....	....	....	....	....	....
1897, Jan. 20—Nor. Pac	.50	.60	....	....	.08	....	....	.05	....	....	1.00	....	.10	....	....
1897—Southern Pac., 75-lb.—															
East of Alleghanies	.48	.58	.53	....	.06	....	....	.07	....	.80	1.00	....	.10	.15	....
West of Alleghanies	.45	.55	.50	....	.085	....	....	.05	....	.80	1.00	....	.10	.15	....
1897, October 8—L. & N.—															
58¼-lb.	.42	.52	....	....	.085	....	....	.07	....	....	....	....	.15	.20	....
70-lb.	.47	.57	....	....	.085	....	....	.07	....	....	....	....	.15	.20	....
80-lb.	.55	.65	....	....	.085	....	....	.07	....	....	....	....	.15	.20	....
1898—C. N. O. & T. P., 75-lb	.42	.47	....	....	.10	....	....	.05	....	....	....	....	....	....	....
Southern Pacific—															
70-lb.	.40	.50	....	....	.10	....	....	.05	....	....	....	....	....	....	....
80-lb.	.40	.50	....	....	.10	....	....	.05	....	....	....	....	....	....	....
1899—Cambria Steel Co	.40	.60	....	....	.10	....	....	....	....	....	....	....	....	....	....
Norfolk & Western, 85-lb	.55	.63	....	....	.085	....	....	.04	....	.90	1.10	....	.10	.14	....
C. B. & Q.—															
65-lb.	.45	....	....	....	.085	....	....	....	....	....	....	....	....	....	....
75-lb.	.55	....	....	....	.085	....	....	....	....	....	....	....	.10	....	....
Sou. Pac., 96-lb.—															
East of Alleghanies	.58	.68	.63	....	.06	....	....	.07	....	.80	1.00	....	.10	.15	....
West of Alleghanies	.55	.65	.60	....	.085	....	....	.05	....	.80	1.00	....	.10	.15	....
1899, Jan. 1—I. S. Co.—															
50-lb. to 60-lb.	.35	.45	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
60-lb. to 70-lb.	.38	.48	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
70-lb. to 80-lb.	.40	.50	....	....	.10	....	....	....	....	.75	1.05	....	....	.20	....
80-lb. to 90-lb.	.43	.53	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
90-lb. to 100-lb.	.45	.55	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
1900—Soc. Testing Materials and A. R. E. A. "Recommendations"—															
50-lb. to 59-lb.+	.35	.45	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
60-lb. to 69-lb.+	.38	.48	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
70-lb. to 79-lb.+	.40	.50	....	....	.10	....	....	....	....	.75	1.05	....	....	.20	....
80-lb. to 89-lb.+	.43	.53	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
90-lb. to 100-lb	.45	.55	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
1904, Dec. 10—Manufacturers' Standard—															
50-lb. to 60-lb.	.35	.45	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
60-lb. to 70-lb.	.38	.48	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
70-lb. to 80-lb.	.45	.55	....	....	.10	....	....	....	....	.75	1.05	....	....	.20	....
80-lb. to 90-lb.	.48	.58	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
90-lb. to 100-lb.	.50	.60	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
1904—Engineering Standards, Committee of Great Britain—															
Bull Headed Rails	.35	.50	....	....	.075	....	....	.08	....	0.7	1.00	....	....	0.1	....
Flat Bottomed (T)	.35	.50	....	....	.07	....	....	.07	....	0.7	1.00	....	....	0.1	....
1909—R. I. specification, O. H., 85-lb	.59	.72	....	....	.04	....	....	....	....	.60	.90	....	.10	.20	....
I. S. Co., O. H.—															
50-lb. to 60-lb.	.46	.59	....	....	....	....	....	....	....	.60	.90	....	....	....	....
61-lb. to 70-lb.	.46	.59	....	....	....	....	....	....	....	.60	.90	....	....	....	....
71-lb. to 80-lb.	.52	.65	....	....	.04	....	....	....	....	.60	.90	....	....	.20	....
81-lb. to 90-lb.	.59	.72	....	....	....	....	....	....	....	.60	.90	....	....	....	....
91-lb. to 100-lb	.62	.75	....	....	....	....	....	....	....	.60	.90	....	....	....	....
I. S. Co., Bessemer—															
50-lb. to 60-lb.	.35	.45	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
61-lb. to 70-lb.	.35	.45	....	....	.10	....	....	....	....	.70	1.00	....	....	.20	....
71-lb. to 80-lb.	.40	.50	....	....	.10	....	....	....	....	.75	1.05	....	....	.20	....
81-lb. to 90-lb.	.43	.53	....	....	.10	....	....	....	....	.80	1.10	....	....	.20	....
91-lb. to 100-lb.	.45	.55	....	....	.10	....	....	....	....	.84	1.14	....	....	.20	....
1910—A. R. E. A., Bessemer—															
70-lb. and under 85-lb.	.40	.50	....	....	.10	....	....	.075	....	.80	1.10	....	.07	.20	....
85-lb. to 100-lb., inclusive	.45	.55	....	....	.10	....	....	.075	....	.80	1.10	....	.07	.20	....
A. R. E. A., O. H.—															
70-lb. and under 85-lb	.53	.66	....	....	.04	....	....	.06	....	.70	1.00	....	.07	.20	....
85-lb. to 100-lb., inclusive	.63	.76	....	....	.04	....	....	.06	....	.70	1.00	....	.07	.20	....
1912—A. R. E. A.—															
Bessemer	Same as 1910			Same as 1910			....	....	....	Same as 1910			....	0.20	....
O. H.	Same as 1910			Same as 1910			....	....	....	.60	.90	....	....	0.20	....

† Graphite, .65; Copper, .08. ‡ Copper, .105.

* The tendency at this early period was to raise the cry of "high carbon" every time a rail broke without giving any other reason. Judging from the analyses low carbon rails broke as frequently as high, but when an apparently high carbon rail broke they did not look farther for a cause of failure.

** Notwithstanding Dr. Dudley's eminence his contemporaries did not agree with him on either high or low carbon. At present it appears to have been a misapplication of the doctrine of averages. One of his rejected rails was chemically the same as one of his good ones, also only a small percentage of those he called good would have come inside the limits he set.

*** During this period most of the rail was sold on manufacturers' guaranty.

**** The specification of R. W. Hunt caused a considerable disturbance and protest in the steel market. The reason is not apparent as his specification for 60-lb. rail would be .38—.46, which had been commonly used for 15 years. The objection was probably due to the uniformity of results required, but this reason is not brought forward.

tions of their day, gave very satisfactory wear." This hardly seems a correct statement when we find the American Institute of Mining Engineers, the chief society of metallurgists, giving much of their time and space in their proceedings to the question of the faults of steel rails as early as 1880. Individuals had taken the matter up several years earlier. The few cross-sections found were worn down to such an extent that they could not be used in a passing siding, but had just been removed from main track apparently. A number of discussions expressing dissatisfaction with conditions are found in the proceedings of the American Society of Civil Engineers previous to 1890.

8.—The few reports available show that pipes, seams, etc., have always been found in rolled rail. While high carbon requires a higher temperature for welding, there is no ground for the belief that soft steel will absorb defects of mill practice more readily than hard steel. If a seam exists in the head of a rail, it is more logical to assume that it will appear sooner in a soft than in a hard rail under the same stresses. If the pipes and seams are more numerous now than formerly, this indicates less care at the mills.

HOW TO SECURE MAXIMUM USE OF FREIGHT CARS.*

By J. M. Daly.

General Superintendent Transportation, Illinois Central.

The freight car today is the best asset of the railroad. It earns 75 per cent. of our gross revenue, and during the busy season is, without doubt, the best freight solicitor we have.

The earning capacity of each freight car on the Illinois Central per day is $2.34. Eliminate Sundays, holidays and bad order cars and confine it to the busy season, and its gross earning capacity is about $3.85 per day, the net revenue being about $1.15 per day. This one factor cannot be given too much thought and consideration. One hundred loaded cars which we let stand in the yard one day, 100 empty cars we permit to remain one day on team or interchange tracks, 100 cars we fail to pull from repair tracks the date they are repaired, 100 cars loaded with company material we fail to place today for unloading, 100 loaded or empty cars we fail to place in trains the date they are ready for movement, causes us to lose per day approximately $385 gross, or $115 net revenue.

Five years ago the presidents of five of the largest systems made a thorough investigation covering the cost per day of cars. It was found at that time to be 42 cents and had for several years increased approximately 2 cents per day per annum. At that rate, cars today cost the owner 52 cents per day, covering interest and repairs.

Take for example an ordinary congestion or blockade at an important terminal where 5,000 cars are affected, 2,000 of which should have been placed in trains for movement or placed where consignee could unload. For every day that condition is permitted to continue, the company loses $7,700 gross and $2,300 net revenue, or equal to the expense of operating 100 additional switch engines per day to clean it up. This covers only the loss from additional traffic that could have been secured, and does not include the loss of patronage and future traffic, or the claims paid on account of damage sustained by reason of the slow movement of the cars.

The average movement for all freight cars on our road during busy season is 27 miles per day. This is equal to three hours moving in trains and 21 hours standing on sidings, 87 per cent. of the time being consumed on sidings and only 13 per cent. in movement.

The average time consumed by the shipper in loading cars is less than two days and the average time consumed by consignee in unloading is less than three days, Sundays included. The average number of loaded trips made per car per month is 2 7/10, an average of 11 days being required to handle each load. This includes all cars, revenue and company freight cars loaded on our rails and loaded cars received for other roads. The average distance loaded cars move is 204 miles. Therefore, the car on an average, in a busy season, is employed per month as follows: thirteen days in loading and unloading; 3½ days in moving in trains; 13½ days standing waiting movement, switching or repairs; total, 30 days.

Under normal conditions our cars will average 27 miles per day. If we could increase this to 35 miles per day, it would result in obtaining 183,960,000 increased miles out of our present equipment. This divided by 27 miles per day is equal to one car 6,813,333 days at 45 cents per day, or to a saving of $3,065,999.85 in per diem paid for use of foreign cars. It is equal to the service or purchase of 18,666 additional cars. To this must be added the increased revenue that would be derived from the increased use of equipment.

Having made the assertion that we are getting less than 75 per cent. efficiency from our equipment, it devolves upon me to present some tangible data or evidence to substantiate the statement, and in doing so I wish it understood I am not criticising the officers or employees of the Illinois Central. Our average miles per car per day is considerably better than that of other large systems similarly situated. I am dealing with the present methods employed and the lack of proper supervision obtained over the location, movement and use of equipment.

We have approximately 65,000 freight cars on our road. Take all the reports furnished, including special reports from the large terminals on hand car reports, reports of bad order cars, and reports of cars moving in trains, and the total cars reported is about 45,000, leaving 20,000, or 30 per cent. of the cars, unaccounted for. The failure on the part of agents, yardmasters and others to account for so many cars each day, including those reported for movement, or delivery to connections, for unloading, empty available for loading and in bad order, necessarily forces the conclusion that most of them have been overlooked.

As 87 per cent. of the freight equipment on our line is standing at stations, yards and shops at all times, it therefore devolves upon us to devote 100 per cent. of our efforts to supervising the stations, yards and terminals with a view of expediting the movement of the equipment so delayed.

To secure the results in this direction there is only one sane and businesslike method or plan to pursue, and that is to properly organize the terminals and yards so that the men in charge will know of every car they have and why they have it. Instead of knowing that they have 6,000 cars on the terminal in the aggregate, they should know in detail why all of these cars are on the terminal and what cars should not be in the yard, and why they are not moved.

To obtain this result it is necessary in my judgment to employ competent and conscientious yard clerks in sufficient number not only to mechanically go over the tracks assigned to them each day, and take a record of the cars, devoting the entire day to checking the tracks, bringing their reports in in the evening, showing the initials and numbers of every car, whether loaded or empty and the carding reference; but we should employ sufficient yard clerks to check the tracks assigned them in three or four hours in the morning, and then to devote the balance of the day to analyzing the check made and preparing data for the man in charge of the terminal, showing the number of cars ready for movement, whether loaded or empty and their location, the individual cars scattered in the yard for delivery which should have been switched out and placed on team or industry tracks or delivered to connections, the bad order cars that are not placed for repairs on the regularly assigned tracks, the bad order loaded cars not placed for repairs or transfer, the 48-hour loads that have not been moved, the important loading that should have been switched out and forwarded on the regularly assigned train

* Abstract of a committee report rendered at the meeting of Operating Officers of the Illinois Central and Yazoo & Mississippi Valley, Chicago, October 8. The other members of the committee were Richard Rivett, F. M. Jones and N. W. Spangler.

for such loading, failures on the part of switchmen to promptly pull during the night empty cars from team or industry tracks and the placing of other loaded cars on such tracks and a number of other items which should reach the general yardmaster through the channel of the yard clerks.

The employing of expert yard clerks regardless of salary paid will not bring the results if such clerks are burdened with more work than they can do in the time assigned them, because it does no good to check yards unless the result of this check is properly utilized and unless the delays occurring, which should have been prevented, are thoroughly and carefully followed up by the general yardmaster in charge. Not only should he find why the delay occurred in the particular instance, but he should go further and provide some way or means by which similar delays in the future will be avoided. This is demonstrated every week where the same irregularity and failures are taken up at the same identical points and replies received that a remedy has been applied and there will be no further cases of this kind.

A complete and proper yard check taken each day and carefully analyzed will show to the man in charge the number of cars of any commodity on hand for an individual consignee, and also the number of cars per day he is releasing and whether or not he has an accumulation. If he has an accumulation proper notice should be wired the chief despatcher, followed up by a written statement giving him the information in detail showing the initials and numbers of cars, the commodity, the point of shipment and the number of cars released each day, in order that he may use his judgment in regard to furnishing equipment to the shippers for such consignee, or curtail the supply until such time as the accumulation is materially reduced, thereby putting the cars into the service where they will receive prompt handling and unloading and further tend to prevent a congestion on the terminal, which would affect not only this particular consignee's business, but the traffic of other shippers or consignees that are not responsible for creating the congestion.

Proper check of the yard will show whether or not connecting lines are accepting promptly from us traffic as offered, and their failure to do so should be immediately made known to the superintendent in charge in order that he may take the matter up with the connecting line and get relief or have embargo placed against loading to them.

Proper knowledge of the consist of cars in a terminal is absolutely necessary for the man in charge, in order to keep the terminals open and prevent congestions, and this can only be obtained through a careful and systematic checking of the yard. A yard clerk is of little benefit to a company until he has had at least 30 days' experience. In fact, he uses the time of a competent man for nearly that period instructing him and breaking him in and educating him into the local conditions surrounding his work. Therefore promotions from yard clerk to other duties should as far as possible be made between April 1 and August 1 in order that new yard clerks may be properly broken in and be of some service to us when the busy season is on.

I believe that part of our failure to get results from yard clerks is due to the chief yard clerk and the general yardmaster looking upon them as a nuisance instead of encouraging them to go out and find irregularities and make them known, in order that they may be overcome. The general yardmaster's success depends as much on the ability and capacity of the yard clerks he employs as the superintendent's success depends on his trainmasters, chief despatcher and chief clerks, and the yardmaster should realize that he is employed for the purpose of directing the policy and the general work in the yard, rather than for going over the tracks and inspecting the individual cars, which can and should be done equally as well by the yard clerk.

Checks taken on terminals by the demurrage inspectors the past two years frequently show large numbers of loaded cars standing two and three days waiting to be placed on delivery tracks, which are being occupied by empty cars that should have been pulled off. This causes us to lose the use of both the empty and loaded car, causes the terminal to become more or less congested, causes an increased expense in operating the terminal, to say nothing of the dissatisfaction to our patrons and the loss sustained to our revenue because of failure to take care of traffic offered at other points for want of cars.

This should be overcome by assigning to the individual engine foremen the duty and responsibility of switching, placing and handling these individual team and industry tracks, and a schedule showing the hours such tracks should be switched and taken care of should be made, and most important of all no excuse should be taken for failure to carry out such instructions unless in extreme emergencies when the engine and crew are ordered to some other work.

The one possible reason I can assign for failure of the railroads to properly supervise cars on terminals is the personal desire on the part of the men in charge to show from month to month and from year to year that they are operating the terminals for less expense per car handled than their predecessor or than they did during the same month last year. A careful check of the service performed will show that while they have saved the salary of one or two $40 or $50 yard clerks, they have cost us in per diem expense possibly 100 times as much, and in addition are costing us the loss of business because of loss of equipment on the terminal due to the fact that their attention has not been called to it at the time of the delay occurring by the yard clerk that has been taken off. The principle of teamwork, not only on a division, but as between divisions, should be preached and practiced in order that the railway system as a whole may obtain the benefits and in order that the expense may be incurred at the point where the business can be handled the cheapest; and the man in charge of the division where the expense is incurred should receive full credit for his efforts to save the company as a whole.

The day for general yardmasters to supervise large terminals with their feet has long since passed, also the plan of trying to carry all the details in their heads. The terminals have outgrown such primitive methods, and the demands made on the railroads for extraordinary service are too exacting to continue them and it devolves on us to adopt more modern, up-to-date methods. A terminal having 6,000 cars represents an investment of $6,000,000 in cars and nearly that much more in tracks and facilities. The lading in cars represents possibly as much more, or a total of from $15,000,000 to $20,000,000. Does not this justify the employment of the best men available, both at the head and in the ranks?

The general yardmaster has a much more important duty than trying to memorize car numbers or handle detail, although the general impression prevails that unless he can explain to the superintendent in passing through the yard why each individual car is detained, he is not in close touch with his work. A general commanding an army in action today that stops to investigate the errors made by his lieutenants yesterday would be a failure, and a general yardmaster stands in the same attitude. He should be constantly engaged in the battle of moving the business and should constantly be looking forward and not backward, or he also will fail. The successful operating man is the one who can plan his work for tonight and tomorrow—yesterday is a day of the past.

The general yardmaster's office is to direct and supervise the terminal on broad lines. For example, he should personally know at all times what road trains are coming to him; he should know how many trains are made up in the yard ready for power to move; how many tracks in the working yard are waiting to be switched; whether or not his crews serving team and industry tracks are keeping up with their work; whether or not connecting roads are taking cars promptly as offered; how many cars are on hand for each individual consignee, in order to prevent serious congestion by permitting anyone to accumulate more tonnage than can be released promptly.

He should assign to someone the duty of watching the power after it reaches the terminal and keep a record showing the hour engine arrived, its hour over the cinder pit, the hour it was

reported ready for service, the hour it was called and the hour it left, to insure against the loss of power. He should closely confer with the master mechanic regarding delays occurring in furnishing power after arrival on the terminal. He should watch the fleeting of trains into the terminal, which creates delay to the power at the cinder pit and roundhouses and tends to congest the working yard. He should turn over the detail to his chief clerk and devote his time to general supervision and to seeing that his orders are promptly carried out each day.

Frequent checks should be made by the superintendent showing the average time through cars, loaded and empty, remain at district terminals. Some of the larger trunk lines have received material benefits from such checks, getting a more prompt movement through the terminals, which tends to bring about the rotation movement of traffic which has been talked of so much.

At some important district terminals the average time cars were in the yard passing through was a fraction over two hours; at other terminals it averaged over six hours per car. Any time over six hours is considered below standard. Their plan of obtaining this result is to time stamp the waybills on arrival and show the time of arrival as the cars are booked out for movement.

A terminal that keeps cleaned up on cars in road movement has a reserve strength to hold or take in cars in case of washout or other interference, whereas a terminal that is worked on the other theory has little, if any, reserve facilities and invariably becomes congested with the least interference.

Cars are built to transport traffic and not to stand around either empty or loaded. If we were engaged in a teaming or transfer business, would we permit 10 or 20 teams to stand in the stable eating their heads off, because we had no wagons available to hitch them to, when at the same time the wagons were standing loaded waiting for us to place them for unloading, or standing empty at some out of the way place being overlooked for want of proper supervision, while shippers were begging us to handle their traffic?

Many cars are continually being delayed on account of the use of memorandum waybills and the failure of agents to follow up with the shippers and the traffic department and obtain proper billing directions or to obtain rates and divisions where such shipments require it. Cars are also delayed on account of reconsigning privileges, which should at least be curtailed, especially during the busy season. The assistance of the traffic department should be solicited in bringing about this result, by conference with the shippers who resort to this practice to get them to co-operate with us and hold it down to the necessary minimum.

ELECTRICALLY OPERATED FREIGHT HANDLING TRUCK.

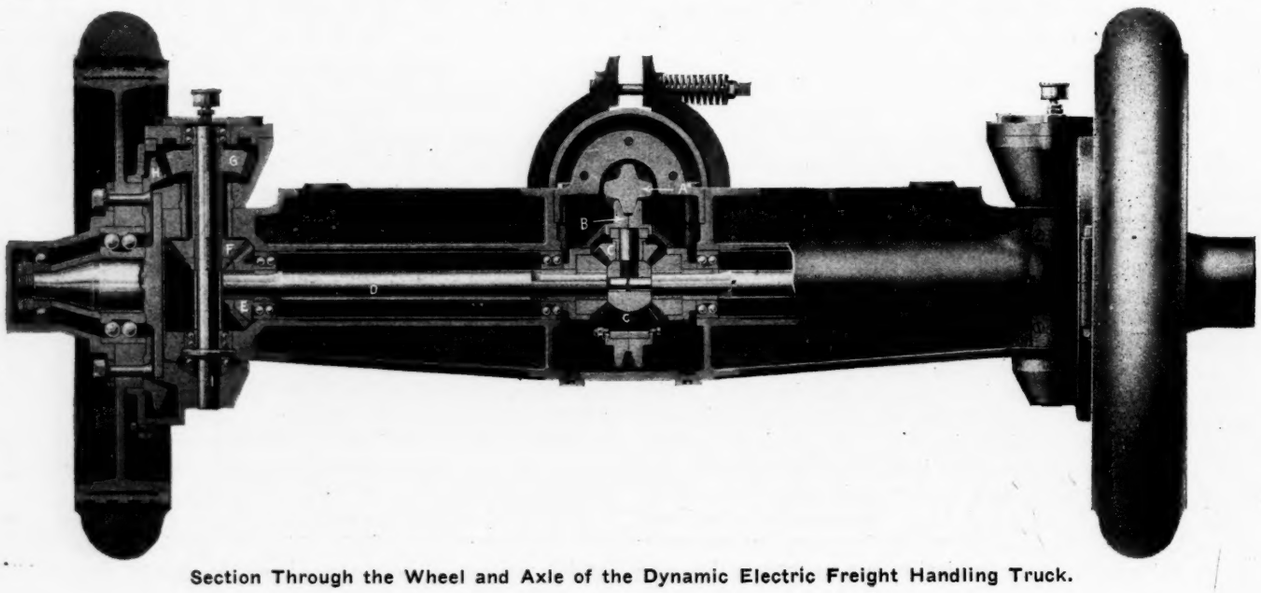
The mechanical handling of freight at stations and warehouses, especially the handling in and out of cars, is a matter of great importance, and of no small difficulty, owing to the narrow doors and limited space within which the trucks must be operated. One of the latest devices for this purpose is an electric trunk, driven by a storage battery, that has been brought out by the Cleveland-Galion Motor Truck Company, of Cleveland, Ohio.

The truck is carried on four wheels, each of which is pivoted and turned for steering after the manner of an automobile. The peculiarity of the truck is that with all four wheels used for steering, the mechanism for that, as well as for the drive, is combined. The manner in which this is done is shown by the engraving of the section of the wheel and axle.

The motor is located at the center of the truck and drives a shaft running longitudinally between the axles, at each end of which is a worm *A*. This worm meshes with the gear *B*, which carries the two gears *C C* that mesh with others on the inner ends of the broken axle, thus forming a differential drive, similar to that used on automobiles. The axle shaft *D* runs in ball bearings, as shown, and carries the gears *E* at its outer end. The gear *E* meshes with one marked *F*, which is keyed to the vertical shaft *I*. This shaft serves not only for the transmission of the power to the wheel, but also as the pivot point about which the wheel turns in steering. The upper end of the shaft carries the gear *G*, which meshes with the one marked *H*, which is fastened directly to the wheel. Thus any rotation of the axle shaft *D* is transmitted direct and without loss of motion to the wheel. The latter is fitted with ball bearings and turns on the projection from the frame as shown.

The steering gear is arranged as shown in the line engravings. The car is steered by means of the hand wheel *K*, which drives the shaft *L* by means of a sprocket chain *M*, and the sprocket wheels. This shaft *L* extends the length of the car and carries the worms *N* and *O*, which mesh with the worm wheels *P* and *Q*, which are keyed to vertical shafts carrying the arms *R* and *S*. The ends of these arms towards the center of the car are attached to the operating arms of the wheels as in an automobile steering gear.

The braking mechanism is shown on the plan. The brake handle has a connection with the rod *T*, which by means of the bell cranks *U U* and connections applies the band brakes *W W*, which operate directly on the main driving shaft *A*.

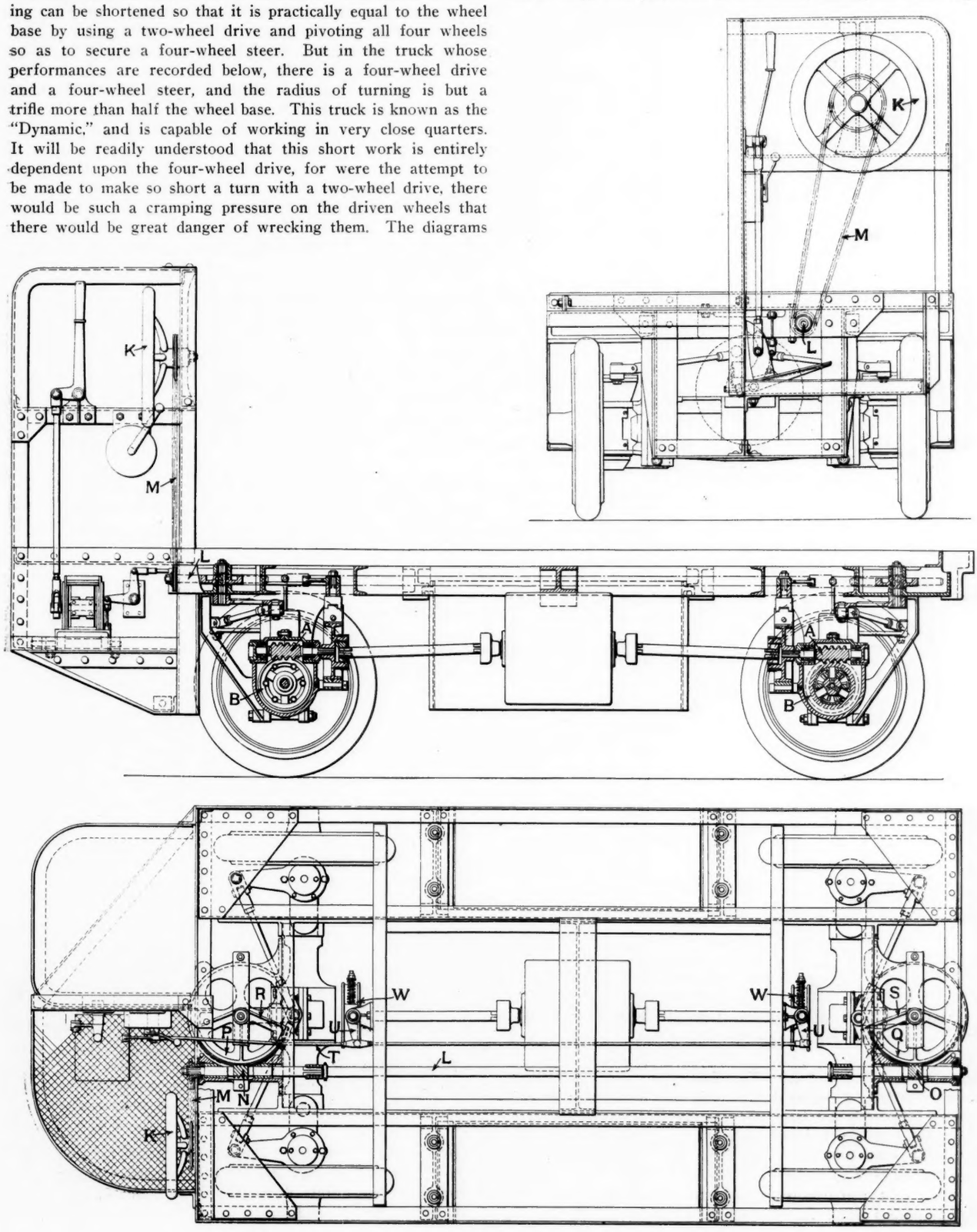


Section Through the Wheel and Axle of the Dynamic Electric Freight Handling Truck.

The batteries are carried in boxes beneath the platform and have an output capable of keeping the truck at work for 10 hours.

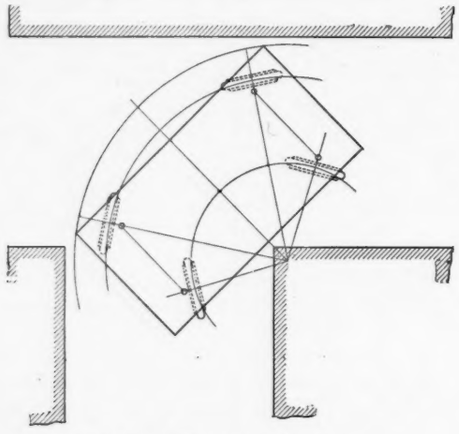
The trucks are made with various arrangements for steering. With two-wheels steering the radius of turning is about twice the wheel base. Such a truck will have a two-wheel drive and resembles an automobile in its action. The radius of turning can be shortened so that it is practically equal to the wheel base by using a two-wheel drive and pivoting all four wheels so as to secure a four-wheel steer. But in the truck whose performances are recorded below, there is a four-wheel drive and a four-wheel steer, and the radius of turning is but a trifle more than half the wheel base. This truck is known as the "Dynamic," and is capable of working in very close quarters. It will be readily understood that this short work is entirely dependent upon the four-wheel drive, for were the attempt to be made to make so short a turn with a two-wheel drive, there would be such a cramping pressure on the driven wheels that there would be great danger of wrecking them. The diagrams show the methods of action of the various types of trucks when turning.

So much for the mechanism of the truck, but the proof of the pudding lies in the eating thereof. A recent test was made of the truck in the freight depot of the Lake Shore & Michigan Southern at Cleveland. The depot is about 100 ft. wide x 600 ft. long, with platforms at both ends, making the total length



General Arrangement of Dynamic Electric Freight Handling Truck.

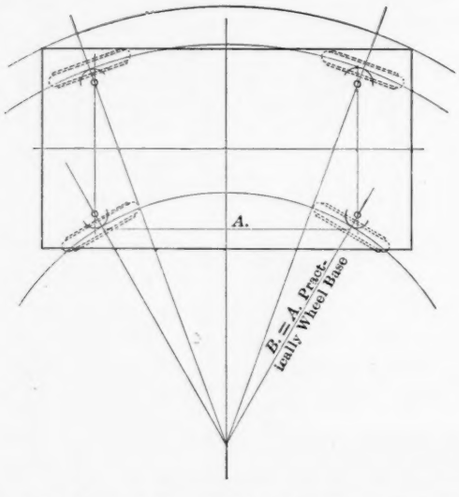
about 800 ft. The general arrangement is shown on the accompanying diagram. One side of the building has doors so spaced that the doors of the freight cars are opposite, in order to load and unload. The interior of the depot is apportioned to the various companies which receive their freight, from which places it is afterwards loaded on the wagons. The depot han-



Making Right Angle Turn.

dles incoming freight, part of which is transferred from one car to another, and the rest is for local concerns. The truck was called upon to handle all sorts of articles—large and small, heavy and light. The length of haul varied from 100 to 800 ft. Freight cars were entered, the truck loaded at the extreme end of the car if necessary, and then run out and into another car, or the goods were transferred to some point in the depot. At times the freight car doors were not exactly opposite the depot doors, so that the actual opening was hardly greater than the width of the truck; but under none of these circumstances was it impossible to enter and turn into the car.

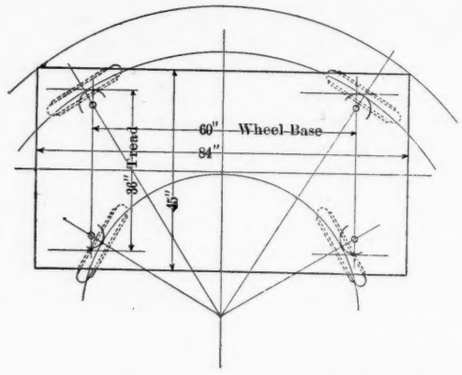
Five tons of flour were taken from a car and hauled a distance



Two-Wheel Drive and Four-Wheel Steer; Radius of Action About Equal to the Wheel Base.

of 260 ft. in 30 min. 43 sec. The flour was mixed with other goods in the freight car, so that five trips were necessary instead of four. Had this not been the case the five tons could have been handled in less than half an hour. In 13 min. 10 sec., 6,000 lbs. of coffee was unloaded from a car and carried 170 ft. At times the truck was loaded as high as the top of the freight car with light merchandise and carried long distances. On other occasions small heavy castings, which would hardly lie on a hand truck without falling through, were put on the truck in quantities up to 3,000 lbs. These usually had to be carried about 700 ft., thus saving much time over the hand trucks.

Grocery supplies, such as boxes of canned goods, crates of eggs, baskets of apples, boxes of tobacco, etc., were loaded on the truck in large quantities. Thirty bushels of apples or 35



Four-Wheel Drive and Four-Wheel Steer; Radius of Action About Half the Wheel Base.

to 40 crates of eggs could be carried on one load. At times several hundred small wooden boxes of yeast foam were placed on the truck, which were very awkward to handle with hand trucks. Many loads had to be distributed to various places in the depot. This worked no hardship on the truck, due to its

Arrangement of Lake Shore Depot and Tracks Where Dynamic Truck Was Tested.

ability to turn sharp corners and get into confined quarters. The truck was experimented with at this depot for about two weeks during the last part of August and first of September, 1912. During part of this time it was doing a good share of the work alone, due to a strike of the truck wheelers at the depot.

Wages in England.—As a result of meetings of the conciliation board, the wages of about 5,000 employees of the Great Eastern Railway have been increased, and the hours of switchmen and signalmen have been reduced. The alterations include increases varying from $1 a week for some London district signalmen to 25 cents for porters, ticket-takers and carmen. The demands of the men, which included a standard eight-hour day and a minimum wage of $5.25 in London and $4.50 in the country, have not been fully conceded.

Proposed Bolivian Line.—The Bolivian government has received a proposal to construct a railway having a gage of 3 ft. 1 in. from Juntas de San Antonio, or Fortin Campero, on the Argentine frontier, along the Bermejo river to the city of Tarija. The route of the proposed railway passes through the capitals of the provinces of Arce and Aviles, and is estimated to cost $4,860,000. A telegraph line is also included in the construction. It is calculated that the entire work can be completed in about five years from the time construction work is begun.

New Chilean Railway.—The new Chilean railway from Iquique through Antofagasta to Talca, connecting the agricultural with the nitrate districts, will probably be opened to traffic by the end of 1913.

General News.

The Illinois Central was sued by the United States district attorney at Chicago on October 2, on ten counts for violation of the federal hours of service law.

The Chicago, Milwaukee & St. Paul was fined $200 and costs in the United States district court at Davenport, Ia., for violations of the federal hours of service law.

The receivers of the Pere Marquette have authorized the purchase of 200,000 ties, in addition to the number laid usually each year and purchased under the regular contract.

It is said that the Grand Trunk Pacific will install telephones for train despatching throughout the entire line. The first division to be changed over will be that between West Fort William and Superior Junction.

Members of five shop crafts aggregating about three hundred men employed in the shops of the Trinity & Brazos Valley at Teague, Tex., went on strike on October 1, as a mark of protest against the recent appointment of a foreman.

The Treasury Department has ordered that health officers shall begin at once an inspection of all trains and vessels in interstate traffic and are to report to Washington the names of railroads and steamship companies on which unsanitary conditions are found.

The Chicago & Eastern Illinois is equipping its line from Evansville, Ill., to Danville, and from Danville to Yard Center, Chicago, with telephones for train despatching. The equipment includes 125 local battery Gill selector outfits. The equipment has been furnished by the General Railway Equipment Company.

A suit has been entered against the Great Northern and the Illinois Central for violation of the 16-hour law. The complaint against the Great Northern is to test whether or not the time spent by a locomotive crew while the locomotive is not running, but while the crew must watch the locomotive, is time on duty or not.

The high quality of work done by apprentices in the shops of the Grand Trunk is shown in the awards just granted to the exhibit of apprentices' drawings at the Toronto Exhibition. The apprentices from Stratford took six prizes for mechanical drawing; getting a total of $32 out of $41. The remaining $9 went to the apprentices from Point St. Charles, Que.

It is expected that within about two weeks commuters coming into the Grand Central station at New York will be sent through the new Grand Central station itself instead of being sent through the temporary wooden passages on the Lexington avenue side of the station that are now used. It is expected that the station will be put in operation about January 1.

Kansas City Southern passenger train No. 4 was held up three and one-half miles north of Poteau, Okla., on the night of October 4 by four masked men who ransacked the mail, blew open the safe in the express car, and escaped into the woods. They are said to have obtained $10,000 and some registered letters. The passengers were not disturbed.

Reports from Atlanta, Ga., say that the strike of trainmen and conductors on the Georgia Railroad has so seriously interfered with train operation that the locomotive enginemen have been ordered by the Brotherhood of Locomotive Enginemen to join the strike. Commissioner of Labor Neill is now in Augusta, Ga., in an effort to bring about a settlement of the strike.

The Co-Operative Safety Congress, held at Milwaukee, Wis., last week, under the auspices of the Association of Iron & Steel Electrical Engineers, at the closing session on Friday resolved itself into a permanent national organization to be known as the National Council for Industrial Safety. Plans for an organized national campaign for the promotion of industrial safety were adopted and arrangements were made for the next safety congress in 1913 in connection with the annual meeting of the Association of Iron & Steel Electrical Engineers. Fred C. Schwedtman of the National Association of Manufacturers was elected chairman of the Congress.

The Boston Elevated Railway has put in use on one of its surface lines an articulated car, which consists of two four-wheel passenger cars connected by a central compartment which rests on the ends of the two cars and is used only for entrance and exit purposes. The car, or combination of cars, will traverse a curve of 35 ft. radius, and by this expedient the company makes use of its cars 20 ft. and 25 ft. long, of which it owns over 1,400. At the same time, it can make use of the pay-as-you-enter feature which cannot possibly be adopted on a single short car. The conductor is stationed opposite the doors of the central compartment, or vestibule, and controls all doors on both cars by pneumatic apparatus. The middle compartment or vestibule is about 14 ft. long from center to center of the king pins, and its two center sills are 5-in. I-beams.

The Atchison, Topeka & Santa Fe has compiled figures showing the results of its safety campaign during the fiscal year ending June 30, 1912. On the lines east of Albuquerque there were 131 fewer persons injured, 18 fewer employees killed and 1,146 fewer employees injured on trains or in shops than in the previous fiscal year. There were also 32 less persons killed and 86 less injured in trespassing and crossing accidents, making a total reduction of 50 killed and 1,363 injured. During eleven months of the fiscal year the claims department reported a reduction of nearly $250,000 in claims paid on the entire system as compared with the entire previous fiscal year. These results follow a personal and unorganized campaign instituted by J. D. M. Hamilton, claims attorney, for the purpose of persuading the employees to get the "safety habit." Since the end of the fiscal year the Santa Fe has organized a safety bureau headed by Isaiah Hale as commissioner of safety.

Attendance in the College of Engineering of the University of Illinois.

The number of students registered in the College of Engineering of the University of Illinois on October 1, 1912, is reported as follows: Architecture and architectural engineering, 334; civil engineering, 213; electrical engineering, 280; mechanical engineering, 253; mining engineering, 26; municipal and sanitary engineering, 23; railway engineering, 20; total, 1,149.

This statement does not include the number of engineering students registered in the Graduate School. The number of undergraduate students in the College of Engineering on the same date last year was 1,206.

An Englishman in New York.

There has been marvelous development in American railroading—much comfort and luxury—but your Pullman cars are an abomination. They're noisy and public, while our sleeping cars are quiet and private. Your subway is a terrible place, crowded and almost dangerous in its stifling, rude crush. We English would suffocate from the frightful air. I wonder you tolerate it. —*Lord Claud John Hamilton, Chairman of the Great Eastern Railway of England; Interview at New York.*

Derailment in Spain.

On October 5 a passenger train was derailed near Alicante, Spain, and nine persons are reported as having been killed and about 100 others injured. The train left the track on a down grade and the locomotive plowed into the station building at Alicante, telescoping some of the cars.

Boiler Inspection Rules.

At a general session of the Interstate Commerce Commission, held at its office in Washington, D. C., on September 12, 1912, it was ordered that Rules 29 and 35, as approved in the order of the commission entered June 2, 1911, be amended to read as follows:

Twenty-nine: Siphon.—Every gage shall have a siphon of ample capacity to prevent steam entering the gage. The pipe connection shall enter the boiler direct and shall be maintained steam tight between boiler and gage. The siphon pipe and its connections to the boiler must be cleaned each time the gage is tested.

Thirty-five: Setting of safety valves.—Safety valves shall be set to pop at pressures not exceeding 6 lbs. above the working steam pressure. When setting safety valves two steam gages shall be used, one of which must be so located that it will be in full view of the person engaged in setting such valves; and if the pressure indicated by the gages varies more than

.3 lbs. they shall be removed from the boiler, tested, and corrected before the safety valves are set. Gages shall in all cases be tested immediately before the safety valves are set or any change made in the setting. When setting safety valves the water level in the boiler shall not be above the highest gage cock.

It was further ordered that the amendments to Rules 29 and 35 be made effective on and after January 1, 1913.

'Frisco Office Efficiency Association.

The association of chief clerks and heads of departments of the St. Louis & San Francisco organized on September 24, as described in the *Railway Age Gazette* of September 27, page 583, is to be known as the 'Frisco Office Efficiency Association. Seventy-eight heads of departments, chief clerks, assistant chief clerks, accountants and timekeepers attended the organization meeting, and the following officers were elected:

President, J. B. Hilton, chief clerk to superintendent eastern division, Springfield, Mo.

First vice-president, C. J. Stephenson, special examiner general manager's office, Springfield, Mo.

Second vice-president, F. E. Brannaman, chief clerk to general superintendent, second district, Springfield, Mo.

Secretary, W. D. Bassett, assistant chief clerk to general manager, Springfield, Mo.

The first meeting to discuss various committee reports will be held about November 20.

Derailment at Westport, Conn.

In the derailment of a westbound express train on the New York, New Haven & Hartford at Westport, Conn., 11 miles east of Stamford, on the afternoon of October 3, four passengers, a mail clerk, the engineman and the fireman were killed, and 20 or more passengers were injured. The train was the second section of No. 53, and the cause of the derailment was excessive speed through a No. 10 crossover, the circumstances being much like those of the derailment of an eastbound express near Bridgeport in July, 1911, although this case occurred in daylight. The engine of No. 53 fell down a bank and the mail car and one parlor car lodged on top of the engine. The other three parlor cars in the train were derailed but not ditched. The mail car and three parlor cars caught fire from the locomotive, and four women in the first parlor car were burned to death.

The engineman of the train, George L. Clark, was an experienced runner. Numerous witnesses say that the speed of the train entering the crossover was 50 or 60 miles an hour and that the distant signal, as well as the home, was properly set against the train. It should have run from the inner to the outer westbound track. This is the course which was taken by the first section of the train, which had passed about 11 minutes prior to the accident. A section foreman who was at work a short distance west of the point of derailment saw the dangerous speed at which the train was coming and ran toward it, waving his hat, but in his testimony before the coroner, he said that he did not succeed in attracting the attention of the engineman. The distant signal is 3,900 ft. in the rear of the crossover, and is visible for a distance of 4,000 ft. before reaching it.

A report shortly after the wreck indicated that a member of the Engineers' Brotherhood criticized the New Haven, claiming that the engineers had been ordered to make up lost time. That there was no foundation for this statement was brought out at the Interstate Commerce Commission hearing at New York on Tuesday, October 8. One of the engineers swore at the hearing that the following bulletin had been posted in the engine houses on September 23:

"Our passenger service has not been running very satisfactorily since the heavy business set in on the 1st of September, although travel has very much decreased, and there is considerable fault on account of so many trains being late.

"Every effort should be made to keep trains on time, and conductors are requested to avoid loss of time at stations loading and unloading passengers, and engineers are requested to do everything they can to make time, except that it is not desired to in any way run trains beyond a safe speed. Neither do we wish to have the orders on slow-downs disregarded.

"Be very careful when you have delays, to make correct reports. Conductors must confer with engineers to make sure that the reports are strictly accurate."

Railway Signal Association.

The seventeenth annual meeting of this association was opened at Chateau Frontenac, Quebec, on Tuesday morning of this week. The number present at the first session was over 200, including a good representation of ladies. On the special train from New York there was a party of over 100, and nearly that number came in a body from Chicago.

President Charles C. Anthony in his address referred felicitously to the presence of so many members from the United States in British dominions, and invited all Canadian signalmen to take part in the meetings. The association is in a flourishing condition; the work of the committees during the past year was very large in volume and fully up to previous standards. Friendly and profitable relations have been maintained with the committee of the American Electric Railway Association, which has to do with signaling, and harmonious progress, as between steam and electric railways, may be confidently expected.

Mr. Anthony alluded to the fact that government regulation of railroad operation is with us and has come to stay. It cannot be successfully opposed, but it may be intelligently directed, and railroad officers should meet the issue in a friendly manner. A committee of the Railway Signal Association has rendered important assistance during the year to the Committee on the Relations of Railway Operation to Legislation. The president commended the work of the committees on the Manual of Standards, recently issued, and on the proposed signal dictionary, the nature of which is to be a vocabulary purely.

Mr. Anthony presented forcibly to the members the duty, if they would make of signal engineering a true profession, of working for the good of society, in the broad sense. They must unselfishly carry out the true professional ideal, which is to utilize the forces of nature for the benefit of man, in accordance with the soundest economy. The signal engineer often must take care not to pursue perfection to the last degree; it is his duty to consider the viewpoint of the general manager, who never has unlimited resources. The attainment of safety and efficiency in the highest degree compatible with a broad view, a thorough comprehension of details, and the truly professional spirit, is the ideal goal.

The executive committee reported that the result of the letter ballot on the question of making Chicago the place for holding all annual meetings was not sufficiently decisive to warrant action looking to that object and it had been decided to do nothing further. It has been decided that where a committee report shall be referred back, the discussion on such report shall not be included in the printed proceedings. J. C. Mock, as a delegate, represented the association at the recent meeting of the International Association for Testing Materials.

In the future there will be only four issues of the *Journal* each year; the procedings of the June meeting will be combined with those of the annual meeting.

The result of the election by letter ballot shows that the officers of the association for the ensuing year will be the following: President, B. H. Mann, Missouri Pacific; first vice-president, F. P. Patenall, Baltimore & Ohio; second vice-president, Thomas S. Stevens, Atchison, Topeka & Santa Fe; secretary-treasurer, C. C. Rosenberg, Bethlehem, Pa. The new members of the board of direction, chosen for the next two years are: J. C. Young, (U. P.); H. W. Lewis (L. V.); R. E. Trout (St. L. & S. F.), and C. A. Dunham (G. N.).

A report of the remainder of the convention will appear in next week's issue.

Railroad Y. M. C. A. Conference.

The fourteenth annual conference of the Railroad Department of the Young Men's Christian Association of North America, held at Chicago on October 3, 4, 5 and 6, was the most successful in point of interest and attendance in the history of the department. Nearly two thousand railway men and delegates from all parts of the United States and Canada were present at the various sessions, including nearly one hundred prominent railway officials and executives. H. U. Mudge, president of the Chicago, Rock Island & Pacific, acted as chairman of the committee on local arrangements.

The sessions of the conference were opened on the afternoon of Thursday, October 3, in Orchestra Hall, Dr. John P.

Munn, chairman of the Railroad Department of the International Committee, acting as presiding officer. Addresses of welcome were made by Rev. John Timothy Stone, pastor of the Fourth Presbyterian church, Chicago; W. P. Sidley, president of Chicago Young Men's Christian Association, and W. A. Garrett, vice-president, Chicago Great Western, who gave some statistics showing the importance of Chicago as the greatest railway center in the world, and spoke of the importance of the railroad department of the Y. M. C. A. to the railways. Responses were made by R. J. Cole, of Derry, Pa.; Samuel Pugh, of Canada; T. E. Clarke, assistant to president Delaware, Lackawanna & Western, and Enoch Barker of New York.

On Thursday evening the annual banquet was held in the First Regiment Armory, at which sixteen hundred were seated at the tables on the main floor, nearly one hundred railway officers at the speakers' table, and approximately five hundred in the spectators' balconies.

Dr. Munn, the presiding officer, introduced the Hon. H. B. F. Macfarland, formerly commissioner of the District of Columbia, as toastmaster, and brief addresses of greeting were made by H. U. Mudge, president of the Rock Island Lines; G. W. Stevens, president of the Chesapeake & Ohio; B. F. Bush, president of the Missouri Pacific and Denver & Rio Grande, and John Carstensen, vice-president New York Central Lines. W. A. Gardner, president of the Chicago & North Western, and C. H. Markham, president of the Illinois Central, who were also on the programme, were unable to be present. Mr. Mudge in his address said that the moral and physical welfare of railway workers is a subject of the utmost importance to all the people of the country, and that the railroad department of the Y. M. C. A. stands for the upbuilding of character and conservation of men. He was gratified to see such a large attendance at the conference, and was hopeful that much good will come from this gathering and a great stimulation of the work of the department.

Mr. Stevens said that the Chesapeake & Ohio was among the first roads to appreciate the importance of the railroad Y. M. C. A. work, and that in the twenty-two years since the first building for the association was established on that line the results have been so great that today every division point and terminal railroad is provided with a building. This includes eleven buildings in operation, costing $200,000, and which take care of a daily attendance of about 3,700 members. "The Railroad Y. M. C. A. has ceased to be an experiment," he said, "and I believe every railway should be provided with its service."

Mr. Bush reminded those in attendance of the important work it is in their power to do in behalf of the railways in bringing about better relations between the carriers and the public. "The railway presidents," he said, "don't belong to any union. You are organized and can protect yourselves, but who is there to protect the owners and executives? For the past five years there have been no game laws for railroads and they are always in season. There has been a great deal of misconception on the part of the public and feeling against the railways which has probably been brought on in part by the past actions of railway executives themselves, but I ask your co-operation and loyal support in helping the public to understand that we too have our troubles. We cannot continue to go on as we are going. It is not within reason that transportation should be the only line of business that can carry a continually increasing expense with a constantly diminishing compensation. If the transportation business is to continue as it should there has got to be a change of sentiment, and we have got to have the fair treatment other lines of business are accorded, or we cannot continue to grow and give the public the service they demand."

Mr. Carstensen related the history of the founding of the first branch of the railroad department of the Y. M. C. A. by Commodore Vanderbilt in the old Grand Central station at New York, and also described the new building to be erected in connection with the new Grand Central Terminal. A letter was read from W. K. Vanderbilt, Jr., expressing appreciation of the work of the association and regretting his inability to be present.

Following the addresses of greeting six four-minute replies to the question, "Why We Believe in the Railroad Association," were given by Wm. Bird, an engineer of the Cleveland, Cincinnati, Chicago & St. Louis; S. B. Hamer, a Chesapeake & Ohio conductor; F. O. Lattimer, a Baltimore & Ohio fireman; W. M. Lethridge, a brakeman on the El Paso & Southwestern; Anse Lawhead, a Pennsylvania switchman; and Wm. Hoffert, a Pennsylvania shopman. All expressed a high sense of appreciation of the remarkable improvement in the conditions surrounding the men at points where Y. M. C. A.'s have been established, comparing the present surroundings with the saloons which formerly presented the only places of rest at the end of their runs when away from home. After the Chesapeake & Ohio conductor had given his talk President Stevens stepped across the platform and congratulated him openly while the audience applauded.

Cyrus H. McCormick, president of the International Harvester Company, and a member of the International Committee of the Y. M. C. A., expressed an appreciation of the work of the association saying it is good business on the part of railways and corporations generally to spend money for welfare work among employees. "The work of the Y. M. C. A. is practical and helpful," he said "This is especially true of the railroad department. The railways owe much to this association for the work it has done so efficiently among their employees. The railways also have set a splendid example to other corporations and employers in the hearty way in which they have co-operated in the work."

Toastmaster Macfarland delivered an address on "The Altruistic Spirit of the Railroad Association." Throughout the dinner and during the speeches motion pictures were shown illustrating many of the association buildings and their rooms in such a way as to give an insight into the work and methods of the association, and also various features of railroad work.

Miss Helen Miller Gould, who had been expected as one of the principal guests at the dinner, was delayed by an accident to her train on the West Shore near Buffalo, and did not reach Chicago until the evening was over.

The programme was resumed at the conference on Friday morning, at which E. H. DeGroot, president of the American Association of Railway Superintendents, presented the report of the Commission on Business Administration. Short talks were given by delegates on "Construction Camps," "Street Railway," "Foreign Countries" and "Unorganized Points."

At the afternoon session, W. G. Lee, president of the Brotherhood of Railway Trainmen, acted as chairman. The conference continued on Friday evening and Saturday morning, followed by an automobile ride for visiting delegates on Saturday afternoon, a church parade and a conference sermon at the Auditorium on Sunday morning, and a railroad men's meeting at Orchestra Hall in the afternoon, at which C. W. Egan, general claim agent of the Baltimore & Ohio presented a stereopticon talk on "Safety Work."

Miss Gould spoke briefly to the delegates at the meeting on Friday morning, received the wives of delegates at the Congress Hotel, and later gave a luncheon for all employees of the Gould Lines present at the Congress Hotel, at which President Bush of the Missouri Pacific and Denver & Rio Grande acted as toastmaster. Short talks were made by E. J. Pearson, vice-president of the Missouri Pacific, and John F. Moore, secretary of the International Y. M. C. A.

An interesting exhibit of various kinds of supplies and furnishings used in Y. M. C. A. buildings was shown in a room at Orchestra Hall by advertisers in the *Association Magazine* at the request of the association.

A large number of group suppers were held at various restaurants in the city by the delegates from the different railway systems.

At the close of each session small slips were distributed at the doors on which was printed in large letters "Save a Delay to a Freight Car a Day." This was done at the instance of a railway executive who declared "That's the best religion I know of just now."

Meeting of Operating Officials of Illinois Central.

The first annual meeting of operating officers of the Illinois Central and the Yazoo & Mississippi Valley was held at the Auditorium Hotel in Chicago, on October 7 and 8. W. L. Park, vice-president and general manager, presided and made an opening address, in which he explained the purpose of the

meeting. Committee reports were made on the following subjects on Monday morning: "Co-operation," C. M. Kittle, chairman; D. W. Longstreet, W. C. Parker, Blewett Lee; "Undesirability of Criticising Without Suggesting a Remedy," A. E. Clift, chairman; J. F. Porterfield, S. S. Morris; "Always Safety First," H. B. Hull, chairman; W. S. Williams, R. V. Fletcher, D. W. Thrower.

At the session on Monday afternoon the first report was on "Courtesy," and was made by Captain C. L. Bent, chairman; C. L. Sively, F. D. Miller and F. M. Dow. The need for courtesy on the part of railway officers and employees to patrons of the railways was dwelt on, and the report concluded with the slogan, "Safety First, Courtesy and Efficient Service Always."

A paper on "The Maintenance of Track and Structures," was prepared by a committee composed of L. W. Baldwin, T. E. Hill, P. Laden and E. J. Boland. Special emphasis was laid on the necessity of doing all work well and completing it before leaving. A careful inspection of all track by the superintendents, roadmasters and track foremen was advocated to see what is necessary to get the track in proper condition for the winter, and to decide what work will be necessary for the coming year, so that plans can be made accordingly and material ordered. Attention was also called to the importance of a well kept right-of-way and buildings and their influence on general operating conditions.

A report on "The Maintenance of Automatic Signals by Track Foremen," was prepared by M. V. Morgan, J. Clifford, A. F. Blaess and N. E. Baker, outlining a proposed combined organization for the maintenance of track and block signals, which it is proposed to try out experimentally on the Tennessee division in the near future.

A report on the "Improvement in the Maintenance and Observation of Signals," was prepared by L. A. Downs, N. E. Baker, C. H. Hammond and W. E. Knox. The committee stated that the necessity for co-operation between the signal and track departments in the maintenance organization suggested one important advantage of combining these forces. A blank on which to report signal failures similar to the engine failures report was suggested in order that failures could be promptly followed up and the responsibility located.

On Monday evening a dinner was given at the Auditorium Hotel. Mr. Park presided, and brief addresses were made by President Markham, Vice-President Parker, Comptroller Blauvelt, General Solicitor Lee and Attorney Sheean. All the speakers dwelt on the need for better co-operation between all departments of the railway. D. C. Buell, chief of the educational bureau of the Illinois Central, made an address, explaining the way in which moving pictures are being used to instruct firemen to fire better and to promote the "safety first" campaign.

On Tuesday, a committee composed of J. J. Pelley, chairman; F. W. Taylor, F. B. Barclay and Willard Dowd, made a report on methods that will increase mileage of locomotives. Special attention was called to hot boxes, the delays in yards, poor despatching, careful and thorough shop repairs and the prompt handling of engines at the terminals. An outline of an engine terminal plant and organization was also given as one insuring the prompt handling of the engines.

"How to Secure Maximum Use of Freight Cars," was the subject of a report by J. M. Daly, chairman; Richard Rivett, F. M. Jones and N. W. Spangler. This report is abstracted elsewhere.

A method of more accurately determining the correct tonnage of a train was presented by the committee on "Increased Tonnage per Locomotive Mile." A chart of adjusted locomotive tonnage ratings was shown for grades up to 80 ft. per mile for the various classes of engines. The engine of greatest tractive effort was considered as a 100 per cent. engine, and all others as so many per cent. of this engine. A speed of 10 m. p. h., and a loaded car weight of 50 tons were taken as a standard. The method of using the chart is as follows: Take the adjusted rating corresponding to the grade and class of engine. Add the constructive tons for that grade to the total weight of the car and divide the sum into the adjusted rating to get the number of cars for the train. For cars heavier than 50 tons the calculated rating will be greater than the actual tonnage rating as given in the chart and for cars of less than 50 tons it will be less. This is as it should be for the resistance per ton is less for a loaded car than an empty one. The committee on this subject was W. M. Baxter, chairman; J. M. Daly, V. V. Boatner and F. B. Oren.

"Prevention of Loss and Damage to Freight," by J. L. East, chairman; D. B. Bristol, T. T. Keliher and G. E. Patterson. It was shown that the gross freight revenue of the Illinois Central in the fiscal year 1912 was $47,184,264, and that the amount charged to operation because of loss and damage to freight was $1,221,418, or 2.59 per cent. of the gross earnings. The large increase in freight claims was attributed chiefly to the fact that shipments are either improperly marked or improperly packed, and it was pointed out that the company must rely mainly on its local agents to remedy this situation. The causes of loss and damage were carefully analyzed. The Loss and Damage Bureau recently established on the Illinois Central will, it was stated, compile statistics showing exactly where the losses are occurring; in other words, will be able to show at any time the number of shorts, overs, bad orders and pilferages, which are occurring from and to each station on the Illinois Central and Y. & M. V. In addition to this, it will be able to show how many shorts, overs, bad orders and pilferages occur on each train operated on the Illinois Central and Y. & M. V., so that those in charge can at all times know where the trouble is, and it will be expected that the proper remedy will in each case be applied.

Assistant agents of the Loss and Damage Bureau will spend ten days on each division, locating and analyzing conditions and irregularities. After the ten days, the general superintendent, with the agent of the Loss and Damage Bureau, will attend a meeting at which there will be present division officers, agents at the larger points and others, where these irregularities will be discussed and corrective methods immediately put in operation.

A committee composed of G. W. Barry, chairman; L. E. McCabe, F. T. Mooney and V. U. Powell, discussed the question of reduction in number of freight cars at terminals. It believed that the first and most important feature is a complete and correct yard check of all cars on hand, both loaded and empty, including cars on industry team tracks and hold tracks. The yard check should show initials, car number, contents and such other information as can be obtained from the car carding. All industry tracks, team tracks and hold tracks should be switched at least once each twenty-four hours, and if there is any failure to perform this service, report should be made to the general roadmaster of each track not switched. The delay to a large number of loaded cars on terminals can be avoided by giving notice promptly to consignees of the arrival of the cars. This can be done in a great many instances by telephone in addition to a form of postal or delivery notice, which will assist in getting disposition twenty-four to forty-eight hours earlier. In addition to this, standing orders from consignees should be secured wherever possible to permit carding of cars for delivery on arrival instead of carding cars until disposition can be secured, which invariably results in a delay of from twenty-four to forty-eight hours, and in many instances longer.

American Electric Manufacturing Association.

At the exhibit of the American Electric Railway Manufacturers' Association, held at the International Amphitheater, Chicago, October 7 to 11, in connection with the convention of the American Electric Railway Association, the following companies manufacturing material or devices used on steam roads were represented:

Allen, Edgar, American Manganese Steel Company, Chicago.—Electric special ground motor gears and pinions, Stag brand manganese steel test bars. Represented by Walter H. Evans.

Allis-Chalmers Company, Milwaukee, Wis.—Air brake equipments, new high speed car compressor, steam turbine model, portable motor driven compressor, transformers, motors, controllers, and photographs of steam engine, gas engine, steam turbine, hydraulic turbine, rotary converter, generator, motor-generator, and switchboard installations. Represented by C. A. Pepper, J. W. Gardner, F. Von Schlegel, H. W. Cheney, I. L. Dimm, W. R. Crawford, J. T. Cunningham, A. W. Burns, E. Dryer, S. R. Curr, C. M. MacDonald, P. F. W. Timm, Joseph Frisch, O. M. Donaldson, Jacob Schaffer and S. C. Orrell.

American Bitumastic Enamels Company, Cleveland, O.—Samples of metal preservative bitumastic enamels and solution and demonstrations of the material under various tests. Represented by H. W. French and H. S. Lippincott.

American Brake Shoe & Foundry Company, Mahwah, N. J.—A. E. R. A. standard brake heads and shoes of all types, steel back and wrought

lugs. Full and partial flange and open flange shoes. Represented by F. W. Sargent, Frank L. Gordon, J. S. Thompson, C. P. Wright, A. G. Delany, M. J. Mulligan, R. M. Brower, E. L. Jones, E. B. Smith, R. L. Dewey, J. G. Tawse and E. A. Gregory.

American Car & Foundry Company, Chicago.—Car wheels and axles, the U. T. D. street car wheels. Represented by Scott H. Blewett, J. M. Keller, W. C. Dickerman, H. C. Haumueller and C. P. Dickerman.

American Mason Safety Tread Company, Boston, Mass.—Mason safety treads, Empire carborundum treads, Stanwood treads, Karbolith flooring. Represented by Henry C. King, M. H. Eddy and R. C. Davison.

American Railway Supply Co., New York.—Cap badges, breast badges, buttons. Represented by Charles Lounsbury.

American Steel & Wire Company, Chicago.—Wires and cables and track bonding devices. Thirty per cent. rubber wire. Represented by C. P. Vaiol, B. H. Ryder, R. J. Wright and C. S. Knight.

Anderson Brake Adjuster Company, Omaha, Neb.—Automatic slack adjuster. Represented by Wilson A. Austin and Charles O. Anderson.

Archbold-Brady Company, Syracuse, N. Y.—Model of tower for electrical transmission wires, photographs and prints of installations. Represented by W. K. Archbold.

Atlas Railway Supply Company, Chicago.—Atlas compromise rail joints, Atlas insulated joints, tie plates and rail braces. Represented by J. G. MacNicholl and D. Thomson.

Baldwin Locomotive Works, Philadelphia, Pa.—Motor truck class 78-22A, built for the Mesaba Railway. Motor truck class 79-25A, built for the Portland, Gray & Lewiston Railroad. Motor truck class 48-14H-2, built for the Washington Railway & Electric Company. Vauclain centering side bearing. Represented by S. A. Bullock, Clarence F. Dodson, Charles Riddell, W. H. Bentley, C. S. Goble, A. Hazelhurst, W. R. Lee and C. H. Peterson.

Berry Bros., Ltd., Detroit, Mich.—Specimens of Copal and shellac gum. Varnished panels, locomotive and car varnishes. Represented by D. W. H. Moreland, Charles H. Smith and Walter E. Paye.

Blocki-Brennan Refining Company, Chicago.—Carboxide elastic metal preserver. Represented by James C. Cleary, Gordon F. Douglass, Glenn E. Plumb, Rudolph Bracker, W. F. Brennan and F. W. Blocki.

Boss Nut Company, Chicago.—Full line of Boss lock nuts, square and hexagonal. Represented by J. P. Benedict, J. A. Maclean and E. Wilhelm.

J. G. Brill Company, Philadelphia, Pa.—Truck 27-GEI, "Radiax" E1 truck, 39-E truck, 27-MCB3 truck, rolled top plush seat, leather covered three-part back seat, cane and wood seat, 18 in. back "Winner" seat, cherry slat seat, stationary rattan covered seat, lined and unlined rattan, model brake hangers, "Dumpit" sand box, "Dedena" gong, folding gates, brake handle, springs, exhaust ventilator, steel platform knee, track scraper, self-ringing gong. Represented by J. W. Rawle, R. B. Libbell, C. F. Rice, F. S. Richards, J. J. Warren, W. A. Lewis, S. M. Curwen, W. H. Heulings, Jr., S. T. Bole, G. M. Haskell, J. E. Brill, G. H. Tontrup, Fred Brill, E. Bronenkamp, R. H. Thompson, D. B. Dean, H. E. Smith, C. F. Johnson, S. M. Wilson, F. L. Marcum, S. K. Colby and J. A. Dawson.

Buda Company, Chicago.—Switch mates, crossings and frogs, solid manganese steel, manganese steel center types of construction for both T-rail and girder rail construction, automatic spring boxes, spring anti-kickers, switch rods and stands, gasoline motor cars. Represented by W. P. Hunt, H. S. Evans, R. B. Fisher, Delbert C. Smith, F. W. Marvel, H. C. Beebe, E. Johnson, J. T. Harahan, Jr., and Lawrence Hammel.

Cambria Steel Company, Johnstown, Pa.—Locomotive and car axles, 100 per cent. rail joints, Morrison guard rail. Represented by A. Morrison, Merrill G. Baker, Clifford J. Ellis, G. Bargart, H. H. Cosley and E. F. Kenney.

Carnegie Steel Company, Pittsburgh, Pa.—Track constructed with 100-lb. A. S. C. E. rail, Duquesne joints and steel cross ties, 33-in. rolled steel wheel, 34-in. rolled steel wheels mounted on axle, Duquesne rail joints showing various treatments, test specimens of vanadium steel, special rail sections and steel piling, rolled steel gear-blank. Represented by Waldo Berry, Robert Coe, L. W. Conroy, C. B. Friday, W. B. Gresham, N. M. Hench, R. P. Hutchinson, J. H. McAlarney, Edwin S. Mills, H. W. Maxson, John C. Neale, K. E. Porter, C. F. W. Rys, N. B. Trist, H. P. Tieman, C. R. Vincent, W. Williams, Geo. W. Landrus, H. Van Zandt, H. L. Baker, J. B. Arnold and P. W. O'Brien.

Central Electric Company, Chicago.—Okonite products, Stanley-Patterson battery holders, high voltage insulators, shop receptacles, plugs, etc., D. & W. products. Represented by J. M. Lorenz, R. N. Baker, J. S. Harley, R. S. Kacin and T. C. Ringgold.

Chicago Pneumatic Tool Company, Chicago.—Electric track drills, grinders, post drills, pneumatic drills and hammers. Represented by C. D. Coates, Charles Schumaker, A. M. Andreasen, G. A. Barden, A. C. Andreasen and Thomas Aldcorn.

Chicago Railway Equipment Company, Chicago.—Creco Monarch and Sterlingworth brake beams, Creco slack adjusters, Creco lubricated side bearings, malleable castings. Represented by Frederick T. DeLong, C. H. Williams, Jr., E. A. Le Beau, E. F. Leigh and J. C. Haswell.

Chicago Varnish Company, Chicago.—Panels treated with the "Ce Ve" process of car painting. Represented by A. C. Morgan, G. S. Bigelow, Fred Gundrum, George G. Porter, Robert Knox and Robert Buckman.

Cleveland Frog & Crossing Company, Cleveland, O.—Combination steam and electric railway rolled manganese rail crossings. Track special work, splice bending machine for offsetting splices, photographs of Kerwin portable crossovers. Represented by George Stanton, G. C. Lucas, L. G. Parker, George Arnolds, Jr., George A. Peabody, J. P. Ruggles, W. S. Morse and W. M. Balkwill.

Consolidated Car-Heating Company, Albany, N. Y.—Door operators (manual type for folding and sliding doors, compressed-air type with push-button switch for remote control, pneumatic car step and trap-door operators, air governor); all-steel ventilated spindle electric heaters for 600 to 1800-volt operation, quick-break knife switches and panel-boards, electric ventilating heaters, coal-burning ventilating heater, thermostatic regulator for automatically controlling car temperature, electric hot-water heaters, buzzer and light signal systems, battery charging relays, tilting heat deflector, highway crossing signal, electric gong ringer, electric couplers. Represented by C. C. Nuckols, James F. McElroy, W. S. Hammond, Jr., Thomas Farmer, Jr., H. L. Hawley, M. C. Carpender, J. H. McElroy, C. A. Eggert and T. N. Bishop.

Continuous Rail Company, New York—Electrical rail crimping machine and section of continuous rail. Represented by Walter Del Mar, Edgar Rhodes and John Noll.

Crouse-Hinds Company, Syracuse, N. Y.—Arc headlights, both carbon and luminous types, incandescent headlights, both flush and surface types; condulets for car wiring, condulets for all types of open conduit wiring, panelboards and cabinets, knife switches, harpoon guy anchor, adjustarods, roundhouse reflectors. Represented by A. F. Hills, F. F. Skeel, D. C. Gidley, Frank Buchanan and W. M. Fagan.

The Curtain Supply Company, Chicago.—Improved ring No. 89 curtain fixture for enclosed grooves, closed cars, operating in small grooves. Improved Ring No. 88 curtain fixture. Improved Rex all-metal curtain roller with holding adjustment. Bulkhead door shield for horizontal curtain with ring No. 88 fixture, ring No. 89 standard enclosed groove. Curtain fixture for open car curtains. Open plait diaphragm and vestibule curtain with automatic release handles. Rex steel sash balance. Represented by W. H. Forsythe, Ross F. Hayes, S. W. Midgeley, George E. Fox and F. M. Egolf.

Dalton Adding Machine Company, Poplar Bluff, Mo.—Dalton adding, listing and calculating machines, including hand-pull machines, electric drives and machine with motor equipped with automatic cut-off. Represented by James L. Dalton, P. N. Sea, C. S. Buchanan, L. E. Keller, W. I. Currie, G. A. Merritt, A. W. Rockwell and S. P. Child.

Dearborn Drug & Chemical Works, Chicago.—Reception room. Represented by Robert F. Carr, George R. Carr, J. W. Harkins, Fred S. Hickey, A. S. Cooke, Paul T. Payne.

Joseph Dixon Crucible Company, Jersey City, N. J.—Graphite products, crucibles and grease. Represented by L. H. Snyder, H. W. Chase, J. H. Condit, Charles Mackintosh, F. R. Brandon, E. R. Smith and W. B. Allan.

G. Drouve Company, Bridgeport, Conn.—Anti-pluvius puttyless skylights, straight push sash operator. Represented by William W. Dee and R. S. Adams.

Duff Manufacturing Company, Pittsburgh, Pa.—Barrett track and automatic lowering jacks, Duff ball-bearing screw jacks, Barrett motor armature lifts, Barrett emergency Bay State jack, Duff-Bethlehem hydraulic jacks. Represented by E. A. Johnson, G. E. Watts and C. A. Methfessel.

Duplex Metals Company, Chester, Pa.—Copper clad steel wire. Represented by C. B. Semple, A. D. Rummel, E. M. Fondersmith, B. F. Cameron and S. C. Munoz.

Edwards, O. M., Company, Syracuse, N. Y.—Window fixtures, metal trap doors, all-metal shade rollers, padlocks, steel furniture. Represented by Edward F. Chaffee, C. H. Rockwell, W. C. Bradbury and T. P. O'Brian.

Egry Register Company, Dayton, Ohio.—Egry train-despatching registers, Egry railway way-billing manifolders. Represented by Milton C. Stern and John Moore.

Emery Pneumatic Lubricator Company, The, St. Louis, Mo.—Pneumatic lubricators and pneumatic lubricant, brake cylinder lubricant. Represented by E. A. Emery and N. J. McAloney.

Falk Company, Milwaukee, Wis.—Switches and mates, frogs and crossings. Represented by W. C. Burdick, H. S. Falk, G. A. Wuester and F. G. Hibbard.

Flood & Conklin Company, Newark, N. J.—Car sections and panels. Represented by L. A. Williams, H. J. Kuhn and L. H. Conklin.

Ford & Johnson Company, Michigan City, Ind.—Interurban seats in leather and plush, steel construction; trolley seats, stationary and reversible type, steel construction in rattan; improved light-weight, stationary trolley seat in rattan; light-weight veneer seat, for trolley service; fiber rush chairs for interurban observation cars. Represented by B. H. Forsyth, C. A. Van Deveer, W. E. Murphy and J. R. Walters.

Forged Steel Wheel Company, Pittsburgh, Pa.—Forged steel wheels and gear blanks. Represented by C. G. Bacon, Jr., W. A. Libkeman, G. N. Boyd, R. L. Gordon, W. G. Cory and J. A. Rapp.

Forsyth Brothers Company, Chicago.—Unit side section for all types of passenger cars, brass sash, metal doors, steel carlines, sash ratchets, draft gear, buffing device. Represented by G. H. Forsyth, A. H. Sisson, Wm. Wampler and E. H. Taylor.

Galena-Signal Oil Company, Franklin, Pa.—Reception booth. Represented by C. C. Sternbrenner, E. H. Baker, E. B. Sedgwick, G. A. Barnes, E. G. Beatty, Mr. Craig, J. C. Glair, Alfred Green, E. M. Hedley, W. H. Lee, W. A. Love, W. H. Pate, C. L. Richards, G. J. Smith, Mr. Southwell, C. H. Thomas, D. A. J. Sullivan, W. C. West, L. J. Drake, Jr., C. A. Record, W. A. MacWhorter, W. A. Trubee, C. E. Schauffler, W. J. Walsh, G. L. Morton, L. R. Speare, F. R. Staklum, R. C. Smith, C. B. Royal.

General Electric Company, Schenectady, N. Y.—New Sprague-General Electric type MK controllers, railway motors, both commutating-pole and self-ventilated; armorized solid gears and pinions; air-brake equipment including air compressors; SG straight air motorman's valve and SF-4 handle, EH-1 emergency, quick-service valve, sectionalized magnet valve, variable-release triple valve and motorman's valve, line material, 600-volt d. c. aluminum-cell lightning arrester for street cars, luminous-arc headlights, steam-flow meters, testing meters, indicating and recording meters, CP-28 portable air compressor, two types of ozonators, battery truck crane. Represented by J. G. Barry, A. K. Baylor, G. H. Hill, F. E. Case, C. E. Barry, E. H. Ginn, J. F. Layng, C. B. Keyes, H. N. Latey, J. H. Livsey, L. W. Shugg, W. J. Clark, E. P. Waller, H. L. Monroe, H. C. Marsh, W. G. Carey, W. A. Woolford, C. E. Eveleth, A. V. Thompson, V. E. Raggio, W. C. Campell, George D. Rosenthal, J. C. Calisch, H. C. Glaze, C. E. Sprague, C. C. Peirce, R. E. Moore, W. B. Potter, S. W. Trawick, F. H. Gale, M. M. Corbin.

General Railway Signal Company, Rochester, N. Y.—Standard line of two-way universal a. c. signals, complete a. c. installation of two signals controlled by track circuits with transformers on stub poles, fuses and lightning arresters, relay model 2 form B for line and track. Model 2 form A for line and track relays. Track and line transformers, impedance bonds, light signals, base of pole and spindle type power signals. Automatic stops, mechanical trip and glass tube type. Switch

boxes and rods. Represented by H. M. Sperry, R. C. Leake, W. K. Howe, H. G. Morgan, S. M. Day.

Gilbert & Barker Manufacturing Company, Springfield, Mass.—Oil storage systems for gasoline, kerosene and heavy lubricating and paint oils, hand and power driven self-measuring pumps, fuel oil and gas furnaces. Represented by C. F. Hatmaker.

Glazene Company, Chicago.—Railroad coach finish glazene for curtain and seats, and newtone for cars. Represented by R. B. Kadish.

Gold Car Heating & Lighting Company, New York, N. Y.—Electric heaters, ventilators, thermostats. Represented by W. H. Stocks, A. E. Robbins.

Goldschmidt Thermit Company, New York.—Materials for welding rails, compromise joints, electric motor cases and truck frames by the Thermit process, samples of work done, samples of metal produced free from carbon as shown by the Thermit grinder in operation. Represented by William C. Cuntz, F. W. Cohen, Felix Lange, H. S. Mann, W. O. Aldrich, Edw. Bigtrop, C. D. Young.

Green Engineering Company, Chicago.—Photographs of green chain grate stokers, Geco pneumatic ash handling systems, Geco pressure waterbacks and Geco air banks. Represented by Frank S. Spohr and Albert G. Burke, Jr.

Griffin Wheel Company, Chicago.—Griffin FCS chilled iron car wheels. Represented by T. A. Griffin, C. P. Dennett, C. K. Knickerbocker, G. D. Casgrain, H. N. Scott, A. A. Hale, W. A. Bennett, Frank Flinn, William Ferguson.

Grip Nut Company, Chicago.—Grip nuts, metal dust guards for journal boxes, monogram bolt locks and fastenings. Represented by E. R. Hibbard, J. W. Hibbard, W. E. Sharp, W. G. Wilcoxson and C. P. Marye.

Hale & Kilburn Company, Philadelphia.—City, suburban and interurban railway car seats, steel interior car finish, moldings, doors, sash, etc., hard enameled canvas lines rattan. Represented by V. Von Schlegell, A. F. Old, J. G. Bowen, J. K. Hoffman, I. Lubersky, F. Edson and H. Rotchester.

Harrison Safety Boiler Works, Philadelphia.—Cochrane feed water heater, Cochrane multi-port safety exhaust outlet valve for back pressure vacuum service, Cochrane steam and oil separators. Represented by A. Sorge, Jr., C. B. White, W. G. Tellin and W. S. Elder.

Hess-Bright Manufacturing Company, Philadelphia, Pa.—Ball bearings for railway motors and car journals. Standard steel wheels with ball bearing journal boxes. 100 h. p. Jeffrey mining type motor mounted on ball bearings, Electro Dynamic motor on ball bearings device for showing friction between plain and ball bearing journals. Represented by W. L. Batt and E. W. Rubencame.

Heywood Brothers & Wakefield Company, Wakefield, Mass.—Parlor car chairs and car seat webbing. Represented by Scot Wade, Betram Berry and E. C. Lang.

Home Rubber Company, Trenton, N. J.—N. B. O. sheet packing, N. B. O. steam hose, O. I. M. rod packing, water and steam hose insulation hose. Represented by S. F. Denny and H. Stuart.

Indianapolis Switch & Frog Company, Indianapolis, Ind.—Portable electric welder for welding broken rails, hard center frogs for switch pieces, truck frames, gear cases, etc., solid manganese frogs and crossings. Represented by E. C. Price, J. C. Jameson, J. A. Foulks and E. S. Brannaman.

International Steel Tie Company, Cleveland, Ohio.—Insulated steel ties, new sub-structure for railway crossings. Represented by William P. Day, J. J. O'Donnell, George Harpham, W. C. Mahon.

Johns-Manville, H. W., Company, New York City.—J-M fiber conduit for underground work; overhead trolley and transmission-line fittings; J-M Transite ebony asbestos wood and J-M Transit asbestos wood; "Noark" car fuse boxes and "Noark" N. E. C. S. protective devices, such as fuses, cutouts, service switches, etc.; trolley retrievers, trolley ears, lightning arresters, controlators and Audiffren-Singrun refrigerating machine. Represented by S. G. Meek, H. M. Frantz, H. W. Frantz, G. W. Saylor, H. M. Voorhees, A. Gove Newton.

Jones & Laughlin Steel Company, Pittsburgh, Pa.—Cold rolled steel tin plate and black sheets. Spikes, cold twisted square bars, nails and wire products, structural shapes and bars, power transmission machinery, chains, cold rolled axles, steel sheet filing. Represented by Roland Gerry, B. N. Barker, F. S. Slocum, J. K. Barker.

Kennicott Company, Chicago.—Working models of filter, water softener, water weigher and photographs of steel tanks, stacks and tank cars. Represented by T. G. Windes, William Hawkins, William Jewell, F. S. Donham.

Kerwin Machine Company, Detroit, Mich.—Kerwin-Detroit rail grinder in operation. Represented by James J. Kerwin, Ed. M. Greiner.

Lehon Company, Chicago.—Waterproof and fireproof cloth roofing and insulating paper. Represented by D. B. Wright.

Loraine Steel Company, Johnstown, Pa.—Two tadpole switches, two mates, and a frog cast in one piece weighing four tons and measuring 28 ft. long. Solid manganese crossings, solid manganese tadpole tongue switches and other switch materials. Represented by P. M. Boyd, H. C. Evans, A. S. Littlefield, S. P. MacGuff, C. G. Donnell, H. H. MacDonald, John A. Stacy, Carroll Burton, H. C. Stiff, E. B. Entwhistle, H. F. A. Kleinschmidt, W. M. Brown, George Rees, George Decker, William Lyman, W. W. Kingston, A. K. Verner and H. E. Gleason.

Love Brake Shoe Company, Chicago.—Chicago brake shoes for steam and electric cars. Represented by C. W. Armbrust and B. F. Gorder.

McCabe, J. J., New York, N. Y.—Latest heavy pattern "2-in-1" double-spindle lathe with newly designed tool rest for wheel turning, also special wheel-holding attachment; lathe in operation turning car wheels and handling other repairs. Represented by Harry P. McCabe, Frank Sheeran, George L. Bennett, Walter Cantelo.

McCord Manufacturing Company, Chicago.—Several types of sash locks, copper insulated locks, deck sash ratchets, Universal weather stripping. Represented by B. S. McClellan, B. C. Wilt, August Hartbauer, Frank Creer.

McGuire-Cummings Manufacturing Company, Chicago.—Interurban combination car, passenger, smoker and baggage; 20-A trucks installed, high-speed MCB truck 70-A, MCB truck 10-B, Columbia single truck. Represented by J. J. Cummings, W. J. Cummings, C. T. Biddison, R. S. Noden, M. T. Kirschke, Jr., J. T. Giblin, C. F. Propst, William Duga.

McQuay-Norris Manufacturing Company, St. Louis, Mo.—"Leak-proof" piston head packing rings for compressors, pumps and engines of all types. Represented by W. K. Norris, E. H. Hill, H. G. Paro, C. R. Travis.

Midvale Steel Company, Nicetown, Pa.—Rolled steel wheels, armature shafts, forged steel gear blank. Properly heat treated axles, pressed steel pony truck wheels. Represented by H. M. Deemer, Ernest Harrah, D. V. Foster, J. Bradley Paterson, Lloyd R. Wells, E. F. Berger, S. Hazelwood, Thomas Price, H. C. Johnstone, W. S. Edger, T. Illingworth, F. W. Sager, G. Ackertsen, J. R. Halcomb, Charles Tietz, M. D. Hayes.

National Brake Company, Buffalo, N. Y.—Peacock and Ackley adjustable brakes, improved Peacock brake. Represented by Frank D. Miller, W. D. Brewster, Thomas C. Boyce.

National Brake & Electric Company, Milwaukee, Wis.—National straight air brakes, stationary motor and belt driven air compressors, portable motor driven air compressor, portable gasoline driven air compressor outfits, National air governors. Represented by R. P. Tell, C. N. Leet, W. D. Glenn, B. S. Aikman, J. J. Nef, W. H. Beatty, Jr., W. H. Bisel, C. P. Billings, George C. Anthon, G. W. Johnston, W. J. Richards, W. K. Boyle and J. E. Huebel.

National Carbon Company, Cleveland, Ohio.—Brushes, specimens of brushes due to faulty machinery. Represented by O. T. Weaver, F. D. Kathe, E. H. Martinvale, W. O'Connor.

National Lock Washer Company, Newark, N. J.—Car curtains, sash locks, sash balances and high tension nut locks. Represented by J. D. Seymour, Charles Williams, H. J. MacGinn, J. D. Archibald.

National Malleable Castings Company, Chicago.—Radial car couplers, oil boxes, tie plates, rail braces, rail joints, anti-creepers, bridge washers. Represented by E. H. Schmidt, J. W. Stephenson, C. L. Johnson, J. J. Byers, H. I. Hiatt.

National Tube Company, Pittsburgh, Pa.—Shelby overhead trolley-pole-testing machine. National tubular street poles, Kewanee unions and specialties, N. T. C. regrinding valves, N. T. C. malleable and cast iron fittings. Represented by L. F. Hamilton, B. F. Jones, L. R. Phillips, W. L. Schaeffer.

Newman Clock Company, New York.—Portable watchmen's clocks used in railway service. Represented by H. C. Davis.

Northey-Plummer, Ltd., Indianapolis, Ind.—Simmen system of railway signaling in operation, including full-size equipment and automatic train speed control. Represented by J. P. Northey, T. H. Plummer, P. J. Simmen, C. E. Chatfield, J. P. May, E. Moore, P. R. Young.

Pantasote Company, New York.—Samples of pantasote upholstery, curtain materials and Agasote for headlining, roofing and hoods. Represented by John M. High, A. S. Barrows and W. A. Lake.

Pennsylvania Steel Company, Steelton, Pa., and the Maryland Steel Company, Sparrows Point, Md.—Manard tongue switches, solid Manard crossings, Manard mates, spring boxes, adjustable switch point connecting rod, Manard hard center and anvil face frogs, rolled Manard and open hearth rails, New Century and other switch stands, natural alloy track bolt. Represented by J. C. Jay, Jr., Robert F. Belknap, R. W. Read, R. W. Gillespie, Neil E. Salsick, G. S. Vickery, W. M. Henderson, Walter H. Allen, Carl C. Banks, J. Drew Allen, George K. Reel, William Philler, J. B. Smylie, J. F. Henney, J. T. Hill and Charles S. Clark.

Pollak Steel Company, Cincinnati, Ohio.—Pollak special heat treated axles, traction and standard M. C. B. axles. Represented by Julien A. Pollak, H. S. Buck and Frank W. Graves.

Rail Joint Company, New York.—Standard continuous and Weber rail joints fitted to various section of rail, also compromise and insulated joints of these types. Represented by L. F. Braine, V. C. Armstrong, James C. Barr, W. A. Chapman, E. A. Condit, Jr., F. C. Webb, W. D. Bois, H. C. Holloway, G. J. Collins.

Railway Roller Bearing Company, Syracuse, N. Y.—Rollway car wheel with bearings complete mounted on a fixed axle, Rollway center plates and various disassembled parts of different types of bearings, journal box with double ball thrust. Represented by James N. Vandergrift and H. L. Aberdeen.

Railway Supply and Curtain Company, Chicago, Ill.—Car window curtains, sliding-door curtains, deck sash openers, door checks, coin wrappers, Represented by Plato G. Emery, C. W. Braithwaite.

Railway Utility Company, Chicago, Ill.—Utility car ventilators, Utility electric thermostats, Utility electric vacuum car cleaners, Utility high pressure steam or air couplings. Represented by William J. Pine, Lee P. Hynes.

John A. Roebling's Sons, Trenton, N. J.—Bare and insulated wire and cables and fittings. Represented by G. W. Swan F. M. Warner, A. B. Conover, William Slingluff, H. O. Caldwell, Mr. Sumerfelt, Albert Seamans, A. V. Erickson.

St. Louis Car Company, St. Louis, Mo.—Cars, trucks and specialties. Represented by John I. Beggs, E. B. Meissner, Nic LeGrand, G. L. Kippenberger, W. L. Alt, C. R. Beers, Gus Koch, Walter S. Miller, J. C. Wallerstadt, Karl Schliepman, R. L. MacDuffie, H. E. Oesterrick and A. J. Pizzini.

Simmons-Boardman Publishing Company, New York.—Copies of *Railway Age Gazette* and *The Signal Engineer*. Represented by L. B. Sherman, J. N. Reynolds, A. E. Hooven, E. T. Howson, H. F. Lane, H. H. Simmons and C. W. Garrison.

Smith, Peter, Heater Company, Detroit, Mich.—Coal-burning and electric forced ventilation hot air heaters. Represented by Daniel W. Smith, E. J. Smith, W. E. Hinmon, W. M. McKee, M. J. Phelan, H. W. Busch, H. S. Williams.

Spencer Otis Company, Chicago, Ill.—Tie plates for screw spikes and for girder and high T-rails, tie plates for common square spikes, automatic springless dial scales. Represented by Carter Blatchford, W. L. DeRemer, H. H. Hart, A. L. Hammond, L. D. Rockwell, W. D. Thompson, A. J. Odegaard.

Standard Coupler Company, New York, N. Y.—Shim slack adjuster for taking up wear on brake shoes. Represented by George A. Post, Jr., Wilberforce Eckels, W. H. Sauvage, E. H. Walker.

Standard Motor Truck Company, Pittsburgh, Pa.—Standard number C-80P trunk line service high-speed inside hung motor double truck. Represented by A. W. Filed, W. G. Corey, W. J. Price, George Boyd.

Standard Paint Company, New York, N. Y.—P. & B. and S. P. C. insulating varnishes, insulating compounds, insulating tape, Impervite cement floor finishes, Impervite waterproofing material. Represented by John Thomas, Charles E. Smith and Harry A. Inwood.

Standard Roller Bearing Company, Philadelphia.—Standard journal roller bearings. Represented by J. G. Cooley and A. N. Goodfellow.

Standard Steel Works Company, Philadelphia, Pa.—Steel tired wheels, rolled steel wheels, forged heat treated axles, forged gear blanks and car springs. Represented by W. H. Pugh, Jr., Charles Riddell, H. G. Pearce, William Boyer, W. H. Benetey, Clarence Dodson, A. S. Goble, A. A. Green.

Standard Underground Cable Company, Pittsburgh, Pa.—Cables, wires and accessories, junction boxes and cable terminals, jointing material and insulating compound. Represented by J. R. Wiley, C. J. Marsh, E. J. Pietzcker, R. E. Green, D. C. Hamilton, J. H. Lytle.

Sterling Varnish Company, Pittsburgh, Pa.—Samples of Insulating varnishes and paints. Represented by W. V. Whitfield and Alvin S. King.

Stewart Hartshorn Company, East Newark, N. J.—Curtain rollers, sash balances, vestibule rollers. Represented by B. E. Bushnell and E. S. Bushnell.

Templeton, Kenly & Company, Chicago.—Simplex car, coach and bridge jacks. Represented by Alfred E. Barren, J. H. Hummel, Arthur C. Lewis, W. J. Miskells, W. R. Templeton and E. A. Wales.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio.—Gears and pinions that have been in use and made exceptional mileage practice. Represented by C. E. Sawtelle and E. E. Sawtelle.

Transportation Utilities Company, New York, N. Y.—Car specialties, diaphragms, vestibule curtains, car window curtains and fixtures, steel floor plates, Flexolith composition flooring, trap doors, window fittings, Resisto insulation, steel doors, etc. Represented by C. F. Jamison, W. S. Humes, Thomas Dunbar, Jr., W. L. Conwell.

Under-Feed Stoker Company of America, Chicago, Ill.—Jones under-feed stoker. Represented by F. M. Smith, David Hunter, Jr., Charles S. Crowell, R. H. Post, Alfred Lotz.

Union Switch & Signal Company, Swissvale, Pa.—Working models of interurban signaling systems, semaphore signals, light signals, relays, switch boxes, Keystone insulated rail joints, lightning arresters, transformers, switch indicators and impedance bonds for automatic track circuit signaling, staff system instruments. Represented by H. W. Griffin, H. McCready, F. J. Ackerman, S. E. Gillespie, C. R. Bell.

United States Electric Signal Company, West Newton, Mass.—Automatic block signals, automatic car-counting signals, automatic spacing signals, automatic track circuit signals for interurban railways, automatic crossing alarms. Represented by Rowland F. Gammons, John J. Ruddick, Robert S. Bowen, Ralph Mosher.

U. S. Metal & Manufacturing Company, New York.—Selling agents for the Tool Steel Gear & Pinion Company, Cincinnati, and the Pollak Steel Company, Cincinnati. Represented by B. A. Hyman, Jr., C. C. Castle, H. A. Hegeman, H. K. Porter, F. E. Pratt and J. J. Ross.

Valentine & Company, New York.—Valentine's systems of wood and steel car painting, Valspar varnish. Represented by L. B. Valentine, I. H. Munford, J. E. Ham, C. W. Rhoades.

Vixen Tool Company, Philadelphia, Pa.—Demonstration of Vixen files on lathe work and file tests conducted on the Herbert file-testing machine. Vixen rail planers. Represented by H. Rawcliffe, E. H. Wachs, Jr., and W. Will.

Wallace Supply Company, Chicago.—Car fittings, door fixtures, trolley cord, angle benders, eye benders, ring benders, etc. Represented by Wesley Meeteer and Carl Metterhausen.

Ward Equipment Company, New York, N. Y.—Ward's improved passenger car ventilator, special ventilator for electric railway cars. Represented by A. L. Whipple, E. C. Post.

Western Electric Company, New York.—Complete line of overhead material, Shelby trolley poles, Electrene fire extinguishers, electric car heaters, Western Electric Sturtevant vacuum cleaners, linemen's tools, brakes, sandboxes, fare registers and complete line of car equipment material, inter-phones for interior telephone service, train-despatching telephones including way station apparatus, despatchers' apparatus and portable telephones, Pierce brackets, steel pins, Orr reinforcements. Represented by M. A. Oberlander, H. L. Grant, F. D. Killion, R. H. Harper, J. H. Davies, D. C. Guest, C. E. Robinson and I. A. Shively.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—One of the 1,200-volt d. c. Southern Pacific locomotives, one of the 11,000-volt New York, New Haven & Hartford locomotives, field control motors, type HL unit switch control equipments for 600 volts and control equipments and motors for 1,200 volts in operation. Represented by Calvert Townley, C. S. Cook, M. B. Lambert, J. C. McQuiston, H. W. Cope, W. W. Briggs, S. J. Keese, F. H. Shepard, J. J. Sinclair, J. A. Brett, G. S. Vail, W. H. Swift, H. A. Cole, J. J. Gibson, J. G. Miles, H. A. Faber, C. G. Schluederberg, S. D. Levings, T. C. Eayrs, J. P. Alexander, H. C. Stier, P. H. Smith, D. L. Keiser, N. W. Storer, G. M. Eaton, R. E. Hellmund, C. Renshaw, L. E. Schumacher, W. Schaake, G. H. Holy, L. J. Kirby, R. L. Wilson, F. W. Harrison, J. R. Ellicott, C. R. Ellicott, W. G. Kaylor, A. A. Brown, G. B. Kirker, G. F. Leake, L. P. Morris, S. L. Nickolson, C. E. Skinner, J. S. Tritle.

Wheel Truing Brake Shoe Company, Detroit, Mich.—All kinds of abrasive brake shoes, section of various new type of shoes arranged to meet conditions of abnormal wheel wear. Represented by J. M. Griffin and F. F. Griffin.

William Wharton, Jr., & Company, Inc., Philadelphia, Pa.—Solid manganese steel and manganese steel center switches, mates, frogs and crossings in both girder and T-rails, combination spring and tongue locking device, concealed ground throw for work in paved streets, photographs of complicated layouts. Represented by V. Augerer, A. E. Borie, L. R. Ashhurst, R. C. McCloy, G. R. Lyman, H. F. McDermott, Joseph Cavanaugh, J. C. Robinson, A. S. Partridge, W. McLain, C. Eccles, C. E. Buluotti.

Yale & Towne Manufacturing Company, New York.—Chain block electric hoists, and trolleys. Represented by W. A. Hall, R. J. Kleinsind, R. T. Hodgkins and H. R. Butler.

American Electric Railway Association Convention.

The annual convention of the American Electric Railway Association, together with the allied associations, the American Electric Railway Transportation and Traffic Association, American Electric Railway Engineering Association, American Electric Railway Accounting Association and the American Electric Railway Claim Agents' Association, was held October 7-12, at the Saddle and Sirloin Club, at the Union Stock Yards, Chicago. In connection with the convention was held the annual supply exhibit of the American Electric Railway Manufacturers' Association in the International Amphitheater, which, both in point of size and in point of interest and number of exhibits, surpassed all previous efforts of this association. Over 200 companies were represented in the exhibits. In addition to the exhibits in the amphitheater there was a special space outside the building devoted to track exhibits and car and locomotive exhibits on the track of the Chicago Junction Railway. The car and locomotive exhibit included electric locomotives built by the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company for the New York, New Haven & Hartford and the Southern Pacific, several types of "near-side" street cars, one of the "double-track" street cars used on the lines of the New York Railways Company, and various types of city and interurban cars. This was supplemented by an exhibit of trucks, wheels and axles.

The registration at the convention was expected to reach 5,000 before the end of the week. The programme was opened on Monday morning with a business session of the American Electric Railway Association, followed in the afternoon by the opening sessions of the allied associations, which continued their meetings throughout the week.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May, 1913, St. Louis, Mo.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; annual, November 20, 1912, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention 3d week in January, 1913, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, October 21-25, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Meeting Dec. 10-11, 1912, New Orleans, La.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—E. S. Koller, 226 W. Adams St., Chicago; Wed, preceding 3d Thurs., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick building, Chicago.

International Railway General Foremen's Association.—L. H. Bryan, Brown Marx building, Birmingham, Ala.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio.

Maintenance of Way Master Painters' Association of the United States and Canada.—W. G. Wilson, Lehigh Valley, Easton, Pa. Convention, November 19-21, Chicago.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Convention, May, 1913, Chicago.

Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago.

Master Car and Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass.

National Railway Appliances Assoc.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Northern Railroad Club.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 2 Rector St., New York; annual, November 20, 1912, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.

Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo. Next meeting, Nov. 17, 1912, Cincinnati, Ohio.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Convention, Oct. 8-11, Quebec.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.

Railway Supply Manufacturers' Assoc.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

Railway Tel. and Tel. Appliance Assoc.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

Signal Appliance Association.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

Society of Railway Financial Officers.—C. Nyquist, La Salle St. Station, Chicago; annual, October 23-25, Atlantic City, N. J.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, Oct. 17, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

Toledo Transportation Club.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

Traffic Club of Chicago.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Utah Society of Engineers.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Girard Estate at Philadelphia has decided to open for lease to the highest bidder several coal mining properties in the Schuylkill district. The leases are to run for 99 years.

On October 22 electric service is to be begun on the White Stone Landing branch of the Long Island Railroad. The electrical operation of the Port Washington branch, which it was originally intended to begin at the same time as that on the White Stone branch, has been delayed owing to the work of eliminating grade crossings.

The Hocking Valley is to run on October 21-2-3-4-5 an agricultural special, giving lectures at about 30 towns along the road on agricultural subjects, especially on hog raising, poultry raising and soil improvement. One coach is reserved for school children above the sixth grade and they will be given special talks on elementary agriculture.

The general inquiry into freight rates on Canadian railroads west of Port Arthur was resumed on October 7 before the Canadian board of railroad commissioners. The Dominion government and the provincial governments of Manitoba, Saskatchewan and British Columbia, as well as Alberta, were represented by numerous counsel. The defence of the present rates was begun by the Canadian Pacific.

Compromise on Distributive Rates.

The complaint of the Spokane shippers before the Washington public service commission was formally settled at Seattle on October 1 by the adoption of a compromise agreement, the parties to which are the Spokane, Seattle and Tacoma shippers, the railroads engaging in transmountain traffic and the public service commission. As a result of the agreement rates will be reduced on carload shipments from coast points to Spokane and also on less than carload shipments from the coast to interior points. Most of the commodities affected are products of California that are shipped north by water. Spokane shippers agreed to give up the special low rates now in effect to points south of Spokane, and the public service commission will amend its distributive rate order so that the distributive rates from Spokane will be on the same basis as those from other centers. The agreement provides that the commodity rates from Seattle and Tacoma to Spokane shall apply as the minimum to all intermediate points and as the maximum from all intermediate points to Spokane.

Missouri Pacific-Iron Mountain System Breaking Traffic Records.

Complete official figures for the month of August show that the Missouri Pacific-Iron Mountain system handled the largest business of any one month in its history. The gross earnings for the month were $5,612,882, an increase of $852,511 over August of last year. The net earnings were $1,536,683, a net increase of $611,633. The gross earnings for July and August of this year combined total the enormous increase of $1,599,916 over the similar two months of last year. The net increase for the two months is almost as great, footing up $1,376,773. Twice within a week the Missouri Pacific-Iron Mountain system has broken all records. On Friday, September 27, there were 14,063 loaded cars moved on the system. This includes through freight as well as freight loaded on the company's own tracks. The best previous record was also established under the administration of President Bush, on October 27, 1911, when 14,048 loaded cars were moved. On September 23, the Missouri Pacific-Iron Mountain broke all records in its history in the number of cars of revenue freight loaded on its own lines. On that day 3,605 cars were loaded at Missouri Pacific-Iron Mountain stations, exceeding the best previous record of 3,599 cars, made September 9 of this year.

American Association of Passenger Agents.

The fortieth annual convention of the American Association of Passenger Agents was held at Denver, Colo., on October 3, 4 and 5. The attendance included representatives of the pas-

senger departments of the principal railways, steamboat lines and other transportation companies of the United States, Canada and Mexico. At the afternoon session on October 3, Gerrit Fort, passenger traffic manager of the Union Pacific, delivered an address, and A. D. Parker, vice-president of the Colorado & Southern, gave an address at the morning session on October 4. E. L. Lomax, passenger traffic manager of the Western Pacific, was the principal speaker at a banquet on the evening of October 3. The principal topics of discussion at the business meetings were:

"Created Passenger Traffic. What Is It and How Can the Traveling Passenger Agent Develop It?"

"Co-operation of Various Departments, and Its Beneficial Effects."

"Effect of Foreign Immigration on Passenger Traffic."

"Should the slogan 'See America First' be advocated by the railroads of the United States, or will their interests be best conserved by encouraging travel to foreign countries as well as at home?"

"What effect will completion and operation of the Panama Canal have on passenger traffic?"

Car Surpluses and Shortages.

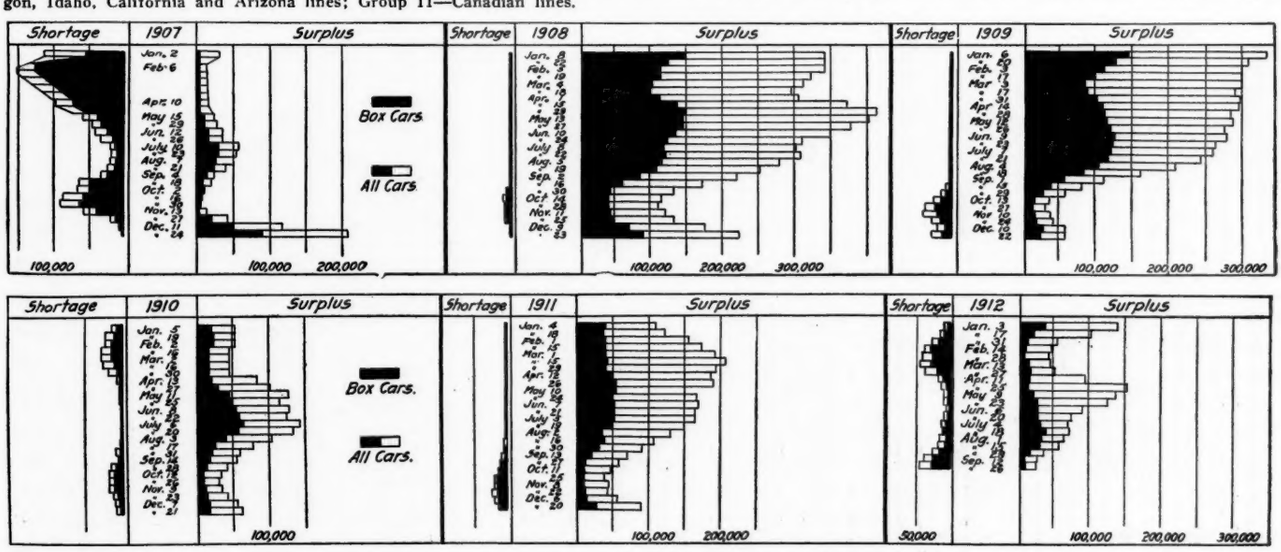
Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 127-A, giving a summary of car surpluses and shortages by groups from June 7, 1911, to September 26, 1912, says: The total surplus on September 26, 1912, was 26,754 cars; on September 12, 1912, was 27,380 cars, and on September 27, 1911, was 58,382 cars. Compared with the preceding period, there is a decrease in the total surplus of 626 cars, made up as follows: a decrease of 2,034 in miscellaneous cars and an increase of 445 box, 79 flat, and 884 coal. The increase in coal car surplus is in groups 3 (Ohio, Indiana, Michigan and Western Pennsylvania), 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida), 6 (Iowa, Illinois, Wisconsin and Minnesota), 7 (Montana, Wyoming, Nebraska and the Dakotas), and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The increase in box car surplus is in groups 6 and 7 (as above), while a decrease is shown in groups 1 (New England Lines), 2 (New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania), 3 (as above), 4 (the Virginias and Carolinas), 5 (as above), 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas), 9 (Texas, Louisiana and New Mexico), 10 (as above), and 11 (Canadian Lines). The increase in flat car surplus is in groups 2, 4 and 8 (as above). The decrease in miscellaneous car surplus is general throughout the country, excepting in groups 4 and 6 (as above).

The total shortage on September 26, 1912, was 44,547 cars; on September 12, 1912, was 36,000 cars, and on September 27, 1911, was 8,344 cars. Compared with the preceding period, there is an increase in the total shortage of 8,547 cars, of which 4,457 is in box, 387 in flat, 3,380 in coal and 323 in miscellaneous. The increase in box car shortage prevails throughout the country, excepting in groups 5 and 6 (as above). The increase in flat car shortage is in groups 6, 8, 9 10 and 11 (as

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—September 26, 1912	7	0	72	0	48	120	859	139	929	24	1,951
" 2.— " 26, 1912	27	293	271	489	441	1,494	2,249	175	2,280	19	4,723
" 3.— " 26, 1912	29	0	53	487	49	589	5,142	359	3,411	462	9,374
" 4.— " 26, 1912	11	0	41	255	392	688	3,413	564	1,893	435	6,305
" 5.— " 26, 1912	21	10	0	215	464	689	2,499	898	1,158	4	4,559
" 6.— " 26, 1912	24	4,354	49	1,603	3,358	9,364	4,134	334	1,334	27	5,829
" 7.— " 26, 1912	2	21	43	64	30	158	786	0	0	14	800
" 8.— " 26, 1912	18	39	113	718	1,724	2,594	2,791	258	496	312	3,857
" 9.— " 26, 1912	11	841	131	329	403	1,704	1,584	131	185	200	2,100
" 10.— " 26, 1912	20	729	540	2,034	3,849	7,152	2,894	240	25	16	3,175
" 11.— " 26, 1912	6	2,064	51	0	87	2,202	943	471	0	460	1,874
Total, September 26, 1912	176	8,351	1,364	6,194	10,845	26,754	27,294	3,569	11,711	1,973	44,547
" September 27, 1911	160	12,372	3,844	19,543	22,623	58,382	6,632	367	955	390	8,344
" September 28, 1910	143	12,144	3,394	7,871	19,060	42,469	9,665	1,670	5,044	1,562	17,941
" September 29, 1909	174	22,330	3,821	11,239	15,998	53,388	8,184	655	4,392	1,351	14,582
" September 30, 1908	160	42,593	10,365	49,795	31,039	133,792	7,313	450	224	127	8,114

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1912.

above). The increase in coal car shortage is in groups 1, 2, 3, 4, 6, 8, 9 and 10 (as above). The increase in miscellaneous car shortage is most apparent in groups 1, 8, 9 and 11 (as above).

Compared with the same date of 1911, there is a decrease in the total surplus of 31,628 cars, of which 4,021 is in box, 2,480 in flat, 13,349 in coal and 11,778 in miscellaneous. There is an increase in the total shortage of 36,203 cars, of which 20,662 is in box, 3,202 in flat, 10,756 in coal, and 1,583 in miscellaneous cars.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report, and totals for the country for corresponding dates in previous years; and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1912.

Summary of Revenues and Expenses of Steam Roads in July.

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon are as follows: The railways whose returns are included in bulletin No. 38 operate 220,629 miles of line, or 90 per cent. of all the steam railway mileage in the United States. The total operating revenues for the month of July, 1912, amounted to $246,160,470. Compared with July, 1911, the total operating revenues of these railways show an increase of $23,190,427. These total operating revenues per mile of line amounted to $1,116 in July, 1912, and $1,027 in July, 1911, an increase for 1912 of $89, or 8.7 per cent. This increase was the resultant of an increase of 13.1 per cent. in the freight revenue together with increases in other transportation and non-transportation revenues, and a decrease of 1.5 per cent. in passenger revenue.

Operating expenses amounted to $165,962,727. This was $14,153,411 more than for July, 1911. These operating expenses per mile of line amounted to $752 in July, 1912, and $699 in July, 1911, an increase for 1912 of $53 per mile, or 7.6 per cent. Each of the five primary operating expense accounts showed an increase for 1912. In the cost per mile of maintaining way and structures, there was an increase compared with July, 1911, of 8.1 per cent.; in the cost per mile of maintaining equipment an increase of 12.0 per cent.; in traffic expenses per mile an increase of 1.8 per cent.; in transportation expenses per mile an increase of 6.3 per cent.; and in general expenses per mile an increase of 1.1 per cent.

Net operating revenue amounted to $80,197,743. This was $9,037,016 more than for July, 1911. Net operating revenue per mile of line amounted to $363.50 in July, 1912, and $327.61 in July, 1911, an increase for 1912 of $35.89 per mile, or 11.0 per cent. The net operating revenue for each mile of line for each day in July, 1912, averaged $11.73, and for July, 1911, $10.57.

Taxes for the month of July amounted to $10,002,877, or $45 per mile, an increase of 8.5 per cent. over July, 1911.

The operating ratio for July was 67.4 per cent., which is comparable with 68.4 per cent. in June, 1912, and 68.1 per cent. in July, 1911.

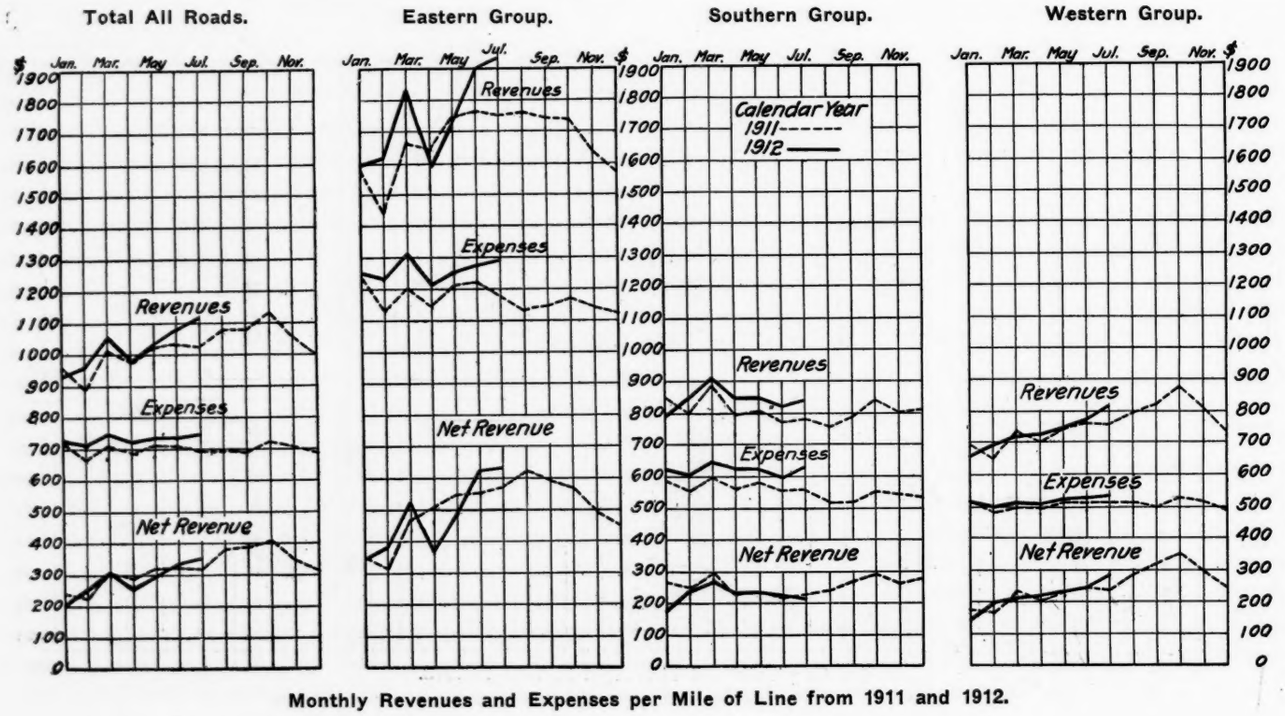
The eastern group of railways shows an increase in total operating revenues per mile of line as compared with July, 1911, of 9.9 per cent., the southern group an increase of 6.5 per cent., and the western group an increase of 8.3 per cent. Operating expenses per mile increased 9.4 per cent. on the eastern railways as compared with July, 1911, 11.3 per cent. on the southern railways, and 4.4 per cent. on the western railways. In the eastern group net operating revenue per mile increased 10.9 per cent. as compared with July, 1911, in the western group it increased 16.4 per cent., while in the southern group it decreased 5.5 per cent. The increase in taxes per mile, compared with July, 1911, was 8.4 per cent. in the eastern group, 5.2 per cent. in the southern group, and 9.7 per cent. in the western group.

When the returns for the seven months of the calendar year 1912 are compared with those of the corresponding months in 1911, they show an increase in total operating revenues per mile of 3.3 per cent., an increase in total operating expenses per mile of 4.9 per cent., and a decrease in net operating revenue per mile of 0.5 per cent. There was an increase in net operating revenue per mile of 1.6 per cent. in the eastern group, an increase of 0.5 per cent. in the western group, and a decrease of 7.8 per cent. in the southern group.

The accompanying diagram shows monthly revenues and expenses per mile of line. The points on the vertical line are alone of significance in showing the condition for the particular month, since the figures are not cumulative. The following table shows the per cent. of total operating revenues consumed by each class of operating expenses:

Per Cent. of Total Operating Revenues.

	July,		Fiscal year ending June 30,		Calendar year ending December 31,	
	1912.	1911.	1912.	1911.	1911.	1910.
Maintenance of way and structures	13.9	14.0	12.7	12.9	12.7	13.3
Maintenance of equipment	16.0	15.5	15.8	15.5	15.5	15.3
Traffic expenses	2.1	2.2	2.2	2.2	2.1	2.1
Transportation expenses	33.1	33.9	35.9	35.5	35.4	34.7
General expenses	2.3	2.5	2.5	2.5	2.6	2.4
Total operating expenses	67.4	68.1	69.1	68.6	68.3	67.8



Monthly Revenues and Expenses per Mile of Line from 1911 and 1912.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF AUGUST, 1912.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	143	$95,552	$43,701	$148,846	$20,925	$24,890	$3,411	$57,299	$4,767	$111,292	$37,554	$39	$5,975	$31,618	$5,574
Alabama Great Southern	309	259,885	125,048	418,240	49,429	87,216	12,453	129,988	8,648	287,734	130,506	—608	14,215	115,683	17,416
Ann Arbor	292	110,714	67,900	190,499	25,896	20,172	4,133	58,319	7,401	115,921	74,578	464	13,930	61,112	—13,203
Arizona Eastern	367[1]	150,903	33,044	196,760	21,653	15,245	2,533	45,721	8,176	93,328	103,432	341	12,096	91,677	28,514
Atchison, Topeka & Santa Fe	8,203[2]	5,365,624	2,157,913	8,115,551	1,439,250	1,286,674	153,135	2,207,940	154,086	5,241,085	2,874,466	.....	330,888	2,543,578	340,305
Atlanta, Birmingham & Atlantic	662	170,144	70,142	257,351	37,825	44,125	16,179	101,449	11,125	210,703	46,648	.....	12,500	34,148	—24,228
Atlantic & St. Lawrence	167	70,250	35,760	114,745	37,873	23,264	4,156	70,806	2,941	139,040	—24,295	.....	7,314	—31,609	—18,074
Atlantic Coast Line	4,607[3]	1,358,679	696,743	2,437,795	373,145	449,724	49,284	942,152	72,019	1,886,324	551,471	.....	125,000	426,471	56,219
Baltimore & Ohio—System	4,455[4]	6,819,210	1,598,961	8,878,270	1,276,042	1,497,859	163,558	2,919,711	153,850	6,011,020	2,867,250	—56,568	205,240	2,605,442	46,116
Baltimore & Ohio Chicago Terminal	77	.....	2,452	170,924	24,478	25,529	680	64,720	4,032	119,439	51,485	945	19,115	33,315	12,787
Bangor & Aroostook	631[5]	150,081	68,722	234,609	50,151	26,571	3,880	72,817	11,469	164,888	69,721	.....	10,500	59,221	—23,953
Bessemer & Lake Erie	204	976,873	55,347	1,043,208	83,699	144,271	11,908	215,477	8,235	463,590	579,618	.....	9,000	570,618	—6,226
Boston & Maine	2,244[6]	2,464,072	1,857,585	4,637,785	544,413	588,668	39,809	1,814,319	99,879	3,087,088	1,550,697	25,170	172,351	1,403,516	187,850
Buffalo, Rochester & Pittsburgh	570[7]	874,511	132,843	1,047,435	161,609	219,158	12,739	293,429	16,796	703,731	343,704	122	17,000	326,826	70,753
Butte, Anaconda & Pacific	46	84,382	16,451	109,982	17,383	20,580	1,068	48,940	2,433	90,404	19,578	.....	2,000	17,578	—5,685
Canadian Pacific Lines in Maine	233	36,966	24,376	68,569	41,199	10,204	5,961	32,794	4,918	95,076	—26,507	.....	10,000	—36,507	—21,412
Carolina, Clinchfield & Ohio	238	200,538	19,364	225,001	16,691	16,919	7,255	34,442	6,207	81,514	143,487	.....	8,000	135,487	35,842
Carolina, Clinchfield & Ohio of S. C.	18	9,351	2,034	11,682	632	74	989	2,438	355	4,488	7,194	.....	500	6,694	989
Central of Georgia	1,915	612,736	383,302	1,088,318	192,987	218,060	33,660	368,269	37,973	850,949	237,369	7,766	51,450	193,685	—11,060
Central New England	277	275,422	36,313	323,750	42,901	21,474	1,092	88,243	2,177	155,887	167,863	463	10,000	158,326	51,438
Charleston & Western Carolina	341	83,872	38,105	129,088	32,107	22,385	3,543	58,845	4,549	121,429	7,659	.....	5,000	2,659	—36,086
Chesapeake & Ohio Lines	2,306[8]	2,476,528	605,271	3,214,298	363,608	596,429	54,007	886,675	64,160	1,964,879	1,249,419	5,944	102,155	1,153,208	103,356
Chicago & Alton	1,026	880,701	431,863	1,403,259	200,780	285,594	35,922	437,357	29,637	989,290	413,969	—2,055	38,000	373,914	—41,851
Chicago & Eastern Illinois	1,275	1,034,120	305,093	1,443,502	212,688	291,027	24,082	502,110	45,379	1,075,286	368,216	—1,868	37,000	329,348	—86,195
Chicago & Northwestern	7,960[9]	4,557,249	2,109,139	7,293,302	1,056,290	1,029,464	129,292	2,620,564	124,937	4,960,547	2,332,755	14,767	303,000	2,044,522	104,887
Chicago, Burlington & Quincy	9,075	5,425,292	2,322,061	8,487,985	1,151,794	1,312,243	138,324	2,380,211	192,060	5,174,632	3,313,353	781	274,588	3,039,546	450,037
Chicago, Great Western	1,496	829,313	322,362	1,239,870	156,379	169,479	50,931	445,747	33,594	856,130	383,740	987	35,090	349,637	69,256
Chicago, Indiana & Southern	359[10]	308,696	29,621	349,231	55,898	90,659	7,938	111,973	7,680	274,148	75,083	704	13,000	62,787	36,502
Chicago, Indianapolis & Louisville	617	404,251	174,702	631,591	90,652	78,627	17,528	211,320	14,583	412,710	218,881	.....	23,651	195,230	—14,721
Chicago Junction	12	.....	.....	165,780	26,146	9,379	1,131	72,278	3,003	111,937	53,843	.....	2,128	51,715	—5,656
Chicago, Milwaukee & Puget Sound	2,081[11]	1,527,466	252,167	1,851,211	167,217	203,951	50,210	539,969	27,645	988,992	862,219	19,047	75,000	806,266	315,201
Chicago, Milwaukee & St. Paul	7,511	3,975,337	1,684,841	6,260,066	829,999	798,876	112,071	2,083,628	70,186	3,894,760	2,365,306	13,232	235,562	2,142,976	1,057,775
Chicago, Peoria & St. Louis	255	120,779	38,812	167,438	20,016	29,747	7,475	65,883	5,239	128,360	39,078	.....	4,300	34,778	11,554
Chicago, Rock Island & Pacific	7,566[12]	4,099,778	1,914,251	6,371,653	991,670	837,252	153,631	2,222,231	125,304	4,330,088	2,041,565	—11,703	231,158	1,798,704	538,402
Chicago, St. Paul, Minneapolis & Omaha	1,744	878,208	484,644	1,457,642	245,445	202,088	29,638	543,055	36,613	1,056,839	400,803	3,062	68,578	335,287	33,813
Chicago, Terre Haute & Southeastern	351	139,790	21,030	164,961	31,044	33,335	2,910	51,045	7,488	125,822	39,139	—125	10,000	29,014	—14,068
Cincinnati, Hamilton & Dayton	1,015	698,959	176,955	971,818	109,620	152,113	20,218	347,314	17,691	646,956	324,862	.....	32,798	292,064	—10,288
Cincinnati, New Orleans & Texas Pacific	337	626,907	166,594	832,707	83,684	187,238	20,896	229,831	19,070	540,719	291,988	—531	29,800	261,657	—58,276
Cincinnati Northern	245[13]	101,740	29,115	136,986	24,974	22,208	2,306	47,086	3,350	99,924	37,062	.....	5,300	31,762	3,579
Cleveland, Cincinnati, Chic. & St. Louis	2,012[14]	2,039,607	897,488	3,175,446	363,608	502,370	59,702	1,031,868	53,885	2,011,433	1,164,013	2,234	95,000	1,071,247	198,856
Colorado Midland	338	131,144	40,753	184,427	29,017	35,362	8,146	77,967	5,335	155,827	28,600	—42	8,000	20,558	—17,438
Colorado & Southern	1,073[15]	491,130	187,894	721,602	123,654	160,991	12,769	203,842	20,533	521,789	199,813	365	29,175	171,003	—53,207
Cumberland Valley	162	202,247	79,129	293,523	52,536	30,572	4,396	82,295	6,771	176,570	116,953	380	5,611	111,722	41,388
Delaware & Hudson Co.—R. R. Dept	854[16]	1,785,719	428,141	2,280,859	164,172	272,126	24,736	693,313	49,823	1,204,170	1,076,689	—43,216	49,030	984,443	100,115
Delaware, Lackawanna & Western	959[17]	2,473,037	802,936	3,492,749	478,176	505,072	66,429	956,269	63,741	2,069,687	1,423,062	41,001	168,940	1,295,123	139,007
Denver & Rio Grande	2,555	1,553,782	561,263	2,215,460	377,352	405,438	50,949	674,643	69,553	1,577,935	637,525	11,671	75,000	574,196	—64,696
Denver, Northwestern & Pacific	215	68,783	60,296	134,566	21,905	15,446	2,158	32,502	3,909	75,920	58,646	.....	3,500	55,146	—9,168
Detroit & Mackinac	411[18]	64,807	38,758	110,441	18,506	13,325	2,227	39,973	3,306	77,337	33,104	618	8,605	25,117	—2,975
Detroit, Grand Haven & Milwaukee	191	113,000	68,000	207,725	69,270	27,046	6,903	90,852	4,530	198,601	9,124	—54	2,953	6,117	—66,315
Detroit River Tunnel	2	.....	.....	97,080	2,047	2,946	.....	7,993	.....	12,986	84,094	.....	4,500	79,594	1,563
Detroit, Toledo & Ironton	441	126,485	16,911	154,379	28,209	11,043	2,520	63,835	4,769	110,376	44,003	.....	6,000	38,003	5,845
Duluth, Missabe & Northern	351[19]	1,092,342	41,874	1,142,838	102,859	88,919	2,083	183,798	11,516	389,175	753,663	6,747	53,082	707,328	—35,864
Duluth, South Shore & Atlantic	626[20]	195,134	103,682	313,881	66,496	31,774	7,146	109,146	11,119	225,681	88,200	2,311	18,000	72,511	—12,410
El Paso & Southwestern Co	902	537,392	78,153	643,600	66,376	95,125	12,906	174,628	22,928	371,963	271,637	—1,219	22,238	248,180	81,513
Elgin, Joliet & Eastern	823[21]	1,035,357	4	1,116,639	123,407	160,447	4,638	274,979	14,904	578,375	538,264	.....	20,333	517,931	148,190
Florida East Coast	642[22]	137,388	87,845	265,622	64,627	49,383	5,097	111,386	10,235	240,728	24,894	.....	15,500	9,394	24,821
Fort Worth & Denver City	454	255,400	154,649	429,975	37,046	74,876	6,972	129,649	14,035	262,578	167,397	—495	11,700	155,202	—28,132
Galveston, Harrisburg & San Antonio	1,338	726,730	261,418	1,032,916	78,364	219,351	29,446	362,560	36,190	725,911	307,005	—5,787	35,123	266,095	—853
Georgia, Southern & Florida	395	98,588	72,358	196,894	21,185	41,437	7,296	78,081	9,402	157,401	39,493	.....	10,626	28,867	5,155
Grand Rapids & Indiana	586[23]	274,730	235,618	551,217	61,088	73,163	11,997	194,826	14,978	356,052	195,165	—45	22,690	172,430	14,402
Grand Trunk Western	347	334,000	225,000	595,080	79,151	82,701	20,685	215,486	12,603	410,626	184,454	—295	29,877	154,282	19,236
Great Northern	7,485[24]	5,002,309	1,422,583	6,876,076	1,081,086	761,519	88,201	1,647,659	120,205	3,698,670	3,177,406	43,315	277,418	2,943,303	308,040
Gulf & Ship Island	308	119,858	39,804	172,226	24,723	28,439	2,347	44,899	8,129	108,537	63,689	.....	5,133	58,556	10,819
Gulf, Colorado & Santa Fe	1,596[25]	719,943	303,941	1,085,890	171,321	146,067	22,543	363,749	31,160	734,840	351,050	.....	40,435	310,615	150,880
Houston, East & West Texas	191	69,045	33,753	108,656	13,530	11,733	2,044	32,829	3,729	63,865	44,791	.....	3,940	40,851	1,824
Houston & Texas Central	789	364,764	179,060	579,086	54,098	91,932	11,167	220,646	16,915	394,758	184,328	—1,384	20,264	162,680	7,117
Illinois Central	4,763	3,547,580	1,279,249	5,548,900	850,309	1,250,031	109,433	2,037,549	127,183	4,374,505	1,174,395	—12,007	237,750	924,638	—257,603
Indiana Harbor Belt	105[26]	.....	.....	252,949	25,765	30,101	2,629	95,277	6,016	159,788	93,161	2,469	5,560	90,070	29,273
Kanawha & Michigan	177[27]	278,914	35,840	320,750	40,387	50,050	2,540	82,301	5,955	181,233	139,517	—19	9,334	130,164	—10,366
Lake Erie & Western	886	429,447	102,746	561,807	89,893	91,525	10,941	183,006	10,897	385,812	175,995	.....	20,495	155,500	—7,276
Lake Shore & Michigan Southern	1,873[28]	3,219,965	1,349,414	5,072,477	628,131	805,639	71,918	1,372,025	74,095	2,951,808	2,120,669	20,337	145,000	1,996,006	29,320
Lehigh & Hudson	97	143,269	6,473	152,029	32,546	22,242	1,198	49,248	3,425	108,659	43,370	.....	4,000	39,370	—5,621
Lehigh Valley	1,453[29]	3,292,997	579,779	3,999,841	520,064	739,071	81,811	1,115,087	63,369	2,519,402	1,480,439	—25,248	117,500	1,337,511	235,412

Operated at the end of the previous period—[1] 355; [2] 7,613; [3] 4,500; [4] 4,434; [5] 628; [6] 2,225; [7] 573; [8] 2,242; [9] 7,754; [10] 341; [11] 2,059; [12] 7,551; [13] 246; [14] 2,010; [15] 1,194; [16] 852; [17] 930; [18] 358; [19] 328; [20] 612; [21] 842; [22] 583; [23] 587; [24] 7,345; [25] 1,587; [26] 109; [27] 176; [28] 1,663; [29] 1,429. — Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF AUGUST, 1912—(CONTINUED).

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Long Island	399	$300,248	$910,632	$1,263,915	$120,225	$110,890	$21,222	$444,235	$18,770	$715,342	$548,573	$86,966	$56,450	$579,089	$54,236
Louisiana & Arkansas	255	114,196	21,737	141,454	24,206	23,222	2,675	37,119	4,963	92,185	49,269	.....	4,033	45,236	22,910
Louisiana Ry. & Navigation	351	116,121	27,660	153,568	21,179	17,111	6,056	53,299	5,539	103,184	50,384	.....	5,500	44,884	3,134
Louisville & Nashville	4,714[30]	3,409,045	1,196,125	4,892,953	801,674	966,167	104,451	1,527,633	99,274	3,499,199	1,393,754	6,262	153,242	1,246,774	—48,350
Louisville, Henderson & St. Louis	200	63,147	38,460	108,695	25,935	14,139	4,107	39,336	2,748	86,265	22,430	92	3,000	19,522	—6,292
Maine Central	1,204[31]	562,417	450,720	1,074,871	193,733	129,046	14,672	352,606	22,563	712,620	362,251	6,308	42,897	325,662	33,358
Michigan Central	1,817[32]	1,711,744	926,927	2,919,182	375,118	396,852	57,744	1,049,350	43,265	1,922,329	996,853	5,914	116,000	886,767	—220,049
Midland Valley	373[33]	90,046	40,654	136,911	38,737	20,982	2,800	41,845	4,900	109,264	27,647	—21	5,468	22,158	18,640
Minneapolis & St. Louis	1,586	573,901	204,672	822,549	101,971	110,366	16,021	313,693	18,599	560,650	261,899	69	28,688	233,280	55,828
Minneapolis, St. Paul & Sault Ste. Marie	3,893[34]	1,670,718	656,951	2,459,789	340,309	325,711	47,679	717,729	47,345	1,478,773	981,016	21,337	138,263	864,090	47,526
Missouri, Kansas & Texas System	3,398	1,715,825	821,519	2,691,722	403,929	382,560	58,700	909,113	75,008	1,829,310	862,412	—11,396	111,656	739,360	326,897
Missouri Pacific	3,920[35]	1,970,123	507,818	2,672,597	413,677	488,844	59,480	971,201	61,028	1,994,230	678,367	—2,723	93,390	582,254	399,021
Mobile & Ohio	1,114	816,234	142,235	1,008,002	120,232	190,590	35,890	362,482	29,153	738,347	269,655	—1,228	29,859	238,568	31,641
Monongahela	65	133,772	2,383	137,545	20,448	7,269	417	25,156	1,975	55,265	82,280	.....	2,000	80,280	32,906
Nashville, Chattanooga & St. Louis	1,231[36]	726,950	301,059	1,098,297	172,743	213,680	36,880	404,298	28,471	856,072	242,225	—682	25,416	216,127	—5,381
Nevada Northern	165	129,754	14,538	147,813	16,560	13,637	344	30,383	3,716	64,640	83,173	.....	6,348	76,825	16,744
New Orleans & North Eastern	196	224,067	56,798	302,593	31,619	56,752	9,714	119,128	10,539	227,752	74,841	—49	12,400	62,392	—11,128
New Orleans Great Northern	283	108,962	33,569	152,783	21,526	17,544	2,144	42,391	7,723	91,328	61,455	—56	1,850	59,549	5,999
New York Central & Hudson River	3,595[37]	5,491,542	3,580,506	10,046,120	1,330,870	1,845,543	169,435	3,221,012	196,168	6,763,028	3,283,092	62,604	524,994	2,820,702	—244,636
New York, Chicago & St. Louis	564[38]	850,650	163,175	1,053,825	135,411	130,459	45,970	424,220	17,412	753,472	300,353	—304	36,000	264,049	—48,003
New York, New Haven & Hartford	2,090	3,113,442	2,778,913	6,410,194	662,935	657,255	30,785	2,107,101	157,525	3,615,601	2,794,593	132,109	318,000	2,608,702	662,866
New York, Ontario & Western	566	652,706	327,072	1,023,883	126,300	126,741	14,701	295,694	16,487	579,923	443,960	1,522	18,166	427,316	96,080
New York, Philadelphia & Norfolk	112	255,786	61,300	342,924	27,973	52,475	4,366	135,264	12,423	232,501	110,423	.....	7,900	102,523	1,595
Norfolk & Western	2,018[39]	3,279,239	479,557	3,874,822	568,189	666,206	57,657	1,019,810	60,670	2,372,532	1,502,290	—4,277	120,000	1,378,013	109,035
Norfolk Southern	608	159,123	102,501	289,986	36,000	41,780	6,777	94,812	13,701	193,070	96,916	—4,884	8,333	83,699	—1,276
Northern Central	473[40]	806,452	249,550	1,117,796	154,453	197,093	17,145	488,458	24,169	881,318	236,478	1,374	36,699	199,153	50,087
Northern Pacific	6,233[41]	4,061,983	1,589,972	6,035,548	942,804	718,274	95,974	1,862,464	72,593	3,692,109	2,343,439	54,717	300,333	2,097,823	11,435
Northwestern Pacific	401[42]	158,397	238,391	420,215	50,270	40,277	4,215	126,163	9,848	230,773	189,442	.....	12,579	176,863	41,479
Oregon Short Line	1,762[43]	1,373,995	502,570	1,982,949	178,335	192,586	26,990	440,399	33,819	872,129	1,110,820	1,546	117,988	994,378	231,374
Oregon-Washington R. R. & Nav. Co.	1,920[44]	1,010,250	488,996	1,596,543	179,128	168,400	40,523	534,745	43,231	966,027	630,516	666	84,742	546,440	63,365
Pecos & Northern Texas	479[45]	159,068	50,830	218,941	27,792	45,273	3,938	58,641	6,200	141,844	77,097	.....	5,625	71,472	28,886
Pennsylvania *Co.*	1,751[46]	4,689,892	980,086	6,227,837	830,880	1,008,073	86,743	1,901,523	92,651	3,919,870	2,307,967	507	225,694	2,082,780	331,067
Pennsylvania *Railroad*	4,021[47]	11,218,845	3,649,915	15,797,062	1,954,334	3,154,455	191,000	5,162,972	332,902	10,795,663	5,001,399	—56,721	587,440	4,357,238	778,711
Peoria & Eastern	352	252,883	69,609	341,105	40,980	42,257	3,939	104,229	5,436	196,841	144,264	.....	9,800	134,464	51,698
Pere Marquette	2,330[48]	929,769	511,691	1,572,373	226,445	240,504	34,562	590,419	35,649	1,127,579	444,794	1,796	57,320	389,270	2,154
Philadelphia, Baltimore & Washington	713	928,153	790,391	1,882,952	297,472	322,392	25,197	724,124	39,694	1,408,879	474,073	.....	52,177	421,896	—29,316
Pittsburgh & Lake Erie	221[49]	1,543,399	165,548	1,774,667	163,717	255,668	12,716	349,731	24,879	806,711	967,956	368	31,000	937,324	182,039
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	2,736,340	822,009	3,917,983	534,624	698,692	73,554	1,268,600	68,078	2,643,548	1,274,435	61	142,611	1,131,885	46,967
Pittsburgh, Shawmut & Northern	279[50]	126,038	12,021	140,616	21,083	32,872	1,056	39,773	3,806	98,590	42,026	.....	1,604	40,422	420
Richmond, Fredericksburgh & Potomac	83	116,595	72,808	218,227	27,991	30,125	2,760	76,869	5,886	143,631	74,596	.....	714	73,882	20,284
Rutland	468	177,494	135,502	357,167	38,173	59,640	8,888	125,653	5,485	237,839	119,328	.....	15,204	104,124	17,555
St. Joseph & Grand Island	319	106,085	44,796	163,277	31,999	18,931	4,786	62,253	4,804	122,773	40,504	—16	6,396	34,092	—2,925
St. Louis & San Francisco	4,742[51]	2,437,429	1,035,019	3,727,572	558,025	483,623	73,362	1,313,683	88,926	2,517,619	1,209,953	.....	160,104	1,049,849	7,241
St. Louis, Brownsville & Mexico	510	148,304	77,470	240,862	43,006	23,370	4,495	107,492	8,661	187,024	53,838	.....	5,500	48,338	—21,916
St. Louis, Iron Mountain & Southern	3,318[52]	2,165,496	577,001	2,940,286	540,856	490,054	54,605	912,678	67,552	2,065,745	874,541	—6,135	90,795	777,611	173,907
St. Louis Merchants' Bridge Terminal	9	.....	394	181,481	29,752	7,325	763	83,692	4,594	126,126	55,355	.....	6,100	49,255	34,492
St. Louis, San Francisco & Texas	244	87,307	31,636	125,502	23,084	14,869	3,172	48,249	5,059	94,433	31,069	.....	1,217	29,852	23,418
St. Louis Southwestern	906[53]	536,119	136,671	701,528	79,197	105,081	26,302	167,425	25,703	403,708	297,820	—533	24,058	273,229	50,126
St. Louis Southwestern of Texas	703	238,646	111,950	374,845	70,530	80,294	10,976	138,870	17,752	318,422	56,423	—218	10,300	45,905	15,173
San Pedro, Los Angeles & Salt Lake	1,135[54]	483,239	284,848	824,277	87,154	131,758	30,783	241,342	18,605	509,642	314,635	—1,461	32,000	281,174	172,742
Seaboard	3,070[55]	1,122,311	468,856	1,775,625	266,908	256,820	60,649	641,391	48,200	1,273,968	501,657	—2,373	81,000	418,284	46,520
Southern	7,034[56]	3,389,758	1,836,836	5,641,370	732,983	938,319	160,259	1,807,220	159,841	3,798,622	1,842,748	1,431	202,297	1,641,882	68,157
Southern in Mississippi	281	43,481	30,207	81,097	29,843	7,706	2,023	35,315	3,907	78,794	2,303	.....	6,762	—4,459	—15,763
Southern Kansas of Texas	125	97,738	21,042	123,592	9,886	25,363	2,439	37,475	3,526	78,689	44,903	.....	2,572	42,331	5,386
Southern Pacific Co.	6,299[57]	5,039,298	2,915,390	8,510,610	695,637	1,018,840	179,222	2,144,444	204,011	4,242,154	4,268,456	133,928	351,701	4,050,683	863,687
Spokane, Portland & Seattle	556[58]	266,889	184,571	486,437	49,720	41,674	8,663	105,682	12,856	218,595	267,842	4,027	53,400	218,469	6,989
Syracuse, Binghamton & New York	81	64,174	41,603	118,338	19,699	12,468	3,056	37,783	1,821	74,827	43,511	.....	6,820	36,691	4,294
Tennessee Central	294	101,267	40,887	149,767	33,036	11,770	5,508	42,410	6,537	99,261	50,506	.....	4,265	46,241	14,749
Terminal R. R. Ass'n of St. Louis	34[59]	.....	293	262,361	35,992	16,468	1,030	90,105	9,466	153,061	109,300	13,339	29,900	92,739	29,270
Texas & New Orleans	458	212,184	95,013	326,788	41,351	73,169	6,846	126,345	11,544	259,255	67,533	1,389	13,384	55,538	8,964
Texas & Pacific	1,885	844,056	403,610	1,353,369	267,496	250,571	33,490	600,078	45,195	1,196,830	156,539	—8,125	48,000	100,414	—223,472
Toledo & Ohio Central	443	393,758	77,816	506,477	93,960	83,098	7,864	156,552	8,799	350,273	156,204	—427	20,294	135,483	—40,406
Toledo, Peoria & Western	248	68,529	45,883	120,003	21,165	24,671	2,766	40,529	3,486	92,617	27,386	.....	4,800	22,586	—2,914
Union Pacific	3,575[60]	3,247,089	1,046,555	4,686,647	427,811	487,688	90,555	1,104,171	109,731	2,219,956	2,466,691	5,781	177,897	2,294,575	270,833
Union R. R. of Baltimore	9	109,142	25,181	135,792	10,896	.....	697	5,280	2,606	19,479	116,313	.....	5,245	111,068	—612
Union R. R. of Pennsylvania	31	.....	.....	490,912	28,142	79,977	109	149,706	2,489	260,423	230,489	2,992	4,750	228,731	5,404
Vandalia	827	664,783	217,175	979,457	138,355	171,204	24,780	330,135	18,422	682,896	296,561	.....	29,944	266,617	73,246
Vicksburg, Shreveport & Pacific	171	84,065	46,419	140,909	34,750	27,891	3,151	40,414	4,705	110,911	29,998	—826	6,300	22,872	6,527
Virginia & Southwestern	240	134,881	16,899	155,498	21,786	35,917	1,901	43,245	3,000	105,849	49,649	.....	5,000	44,649	—13,568
Virginian	474	444,185	33,164	488,870	61,042	96,611	6,027	108,250	8,281	280,311	208,559	6,557	17,400	197,716	37,307
Washington Southern	36	35,523	36,387	99,307	12,154	10,400	1,078	37,771	2,195	63,598	35,709	.....	3,173	32,536	16,474
West Jersey & Seashore	355	199,807	776,550	1,025,618	99,414	126,500	14,321	257,518	12,211	509,964	515,654	—2,107	30,122	483,425	168,495
Yazoo & Mississippi Valley	1,374	486,701	217,934	757,693	169,453	127,267	15,578	318,638	25,464	656,400	101,293	—149	37,000	64,144	—91,969

Operated at the end of the previous period—[30] 4,644; [31] 1,165; [32] 1,805; [33] 324; [34] 3,770; [35] 3,916; [36] 1,255; [37] 3,591; [38] 562; [39] 2,004; [40] 472; [41] 6.017; [42] 404; [43] 1,663; [44] 1,856; [45] 296; [46] 1,416; [47] 3,978; [48] 2,331; [49] 215; [50] 240; [51] 4,732; [52] 3,314; [53] 797; [54] 1,113; [55] 3,046; [56] 7,089; [57] 6,204; [58] 551; [59] 35; [60] 3,498. — Indicates Deficits, Losses and Decreases.

[80] 240; [81] 4,732; [82] 3,314; [83] 797; [84] 1,113; [85] 3,046; [86] 7,089; [87] 6,204; [88] 551; [89] 35; [90] 3,498. — Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

TWO MONTHS OF FISCAL YEAR, 1913.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	General.	Total.					
Alabama & Vicksburg	143	$191,327	$85,998	$296,140	$40,655	$49,105	$6,968	$108,242	$10,201	$215,171	$80,969	—$783	$11,950	$68,236	$25,255
Alabama Great Southern	309	497,412	231,829	792,499	97,190	166,969	25,817	256,764	17,563	564,303	228,196	—1,251	28,150	198,795	136
Ann Arbor	292	215,338	124,503	363,643	47,138	40,118	8,297	121,414	16,209	233,176	130,467	965	27,860	103,572	—13,846
Arizona Eastern	367[1]	304,368	67,681	394,273	38,943	27,612	5,472	95,193	15,899	183,119	211,154	185	24,193	187,146	45,200
Atchison, Topeka & Santa Fe	8,203[2]	10,283,072	4,273,383	15,726,671	2,651,840	2,862,670	314,683	4,346,604	319,295	10,495,092	5,231,579	.....	660,277	4,571,302	669,185
Atlanta, Birmingham & Atlantic	662	339,405	133,021	504,652	80,057	85,313	33,573	223,029	22,469	444,441	60,211	.....	28,200	32,011	—69,260
Atlantic & St. Lawrence	167	132,824	69,494	221,243	71,928	41,580	8,326	112,122	6,242	240,198	—18,955	.....	14,627	—33,582	—9,677
Atlantic Coast Line	4,607[3]	3,169,680	1,377,454	4,905,553	753,572	927,920	90,925	1,911,006	147,069	3,830,492	1,075,061	.....	250,000	825,061	—36,858
Baltimore & Ohio—System	4,455[4]	12,969,670	3,005,670	16,931,156	2,413,921	2,933,204	333,607	5,668,737	322,025	11,671,494	5,259,662	—158,762	449,124	4,651,776	112,979
Baltimore & Ohio Chicago Terminal	77	.....	4,730	319,933	46,256	43,037	1,373	123,717	7,978	222,361	97,562	1,899	38,231	61,240	45,949
Bangor & Aroostook	631[5]	307,591	123,516	469,112	99,854	58,730	8,015	149,182	24,096	339,879	129,235	.....	21,000	108,235	—19,444
Bessemer & Lake Erie	204	1,956,489	93,432	2,071,636	161,391	280,028	21,492	432,466	18,865	914,242	1,157,394	.....	18,000	1,139,394	90,759
Boston & Maine	2,244[6]	4,754,203	3,446,917	8,845,668	1,028,480	1,172,713	78,731	3,589,820	191,066	6,060,810	2,784,858	46,092	344,701	2,486,249	494,119
Buffalo, Rochester & Pittsburgh	570[7]	1,619,459	244,609	1,940,654	309,662	377,547	25,150	565,785	34,409	1,312,553	628,101	466	34,000	594,567	70,550
Butte, Anaconda & Pacific	46	166,755	29,186	212,747	36,337	40,721	1,778	92,627	6,059	177,522	35,225	.....	4,000	31,225	—12,424
Canadian Pacific Lines in Maine	233	77,950	43,011	136,383	79,720	21,602	11,350	62,621	8,722	184,215	—47,832	.....	20,000	—67,832	—22,269
Carolina, Clinchfield & Ohio	238	364,269	37,012	411,161	30,569	35,195	13,661	68,995	13,027	161,447	249,714	.....	16,000	233,714	59,331
Carolina, Clinchfield & Ohio of S. C.	18	17,531	3,582	21,776	1,785	150	1,968	4,822	727	9,452	12,324	.....	1,000	11,324	2,673
Central of Georgia	1,915	1,292,912	747,517	2,216,943	354,932	418,960	69,317	769,513	78,916	1,691,638	525,305	14,251	102,900	436,656	37,786
Central New England	277	533,748	67,626	627,256	83,635	47,118	2,156	169,129	3,328	305,366	321,890	890	20,000	302,780	89,278
Charleston & Western Carolina	341	175,105	68,502	257,203	63,554	48,065	6,998	110,936	9,130	238,683	18,520	.....	10,000	8,520	—55,937
Chesapeake & Ohio Lines	2,306[8]	4,600,375	1,147,440	6,016,273	772,301	1,173,998	109,177	1,718,699	127,844	3,902,019	2,114,254	4,341	204,310	1,914,285	—4,327
Chicago & Alton	1,026	1,632,565	814,994	2,633,870	353,108	512,853	76,985	839,527	61,955	1,844,428	789,442	—3,111	76,000	710,331	—110,084
Chicago & Eastern Illinois	1,275	1,969,651	568,555	2,745,430	354,494	520,043	45,965	963,952	90,841	1,975,295	770,135	—5,180	74,000	690,955	—87,700
Chicago & Northwestern	7,960[9]	8,742,096	4,001,028	14,002,104	2,000,648	1,977,251	246,975	5,105,276	250,232	9,580,382	4,421,722	14,335	606,000	3,830,057	322,254
Chicago, Burlington & Quincy	9,075	9,970,794	4,360,047	15,783,907	2,247,772	2,528,328	285,743	4,730,227	382,350	10,174,420	5,609,487	—16,125	549,434	5,043,928	675,216
Chicago Great Western	1,496	1,532,420	599,582	2,309,145	270,356	327,588	94,364	889,538	67,430	1,649,276	659,869	81	70,272	589,678	91,069
Chicago, Indiana & Southern	359[10]	575,623	58,234	655,178	105,888	173,097	17,332	213,630	15,794	525,741	129,437	1,325	26,000	104,762	79,388
Chicago, Indianapolis & Louisville	617	751,118	320,591	1,175,874	177,079	153,759	35,657	423,694	30,745	820,934	354,940	.....	47,302	307,638	—62,693
Chicago Junction	12	.....	.....	327,887	40,992	20,941	2,146	141,380	6,339	211,798	116,089	.....	4,256	111,833	11,201
Chicago, Milwaukee & Puget Sound	2,081[11]	2,830,037	510,802	3,484,140	371,982	363,681	108,038	1,006,709	47,829	1,898,239	1,585,901	37,741	150,000	1,473,642	417,830
Chicago, Milwaukee & St. Paul	7,511	7,707,274	3,136,429	12,020,684	1,658,051	1,563,028	235,102	4,115,086	141,223	7,712,490	4,308,194	32,172	471,124	3,869,242	1,657,214
Chicago, Peoria & St. Louis	255	223,839	71,573	311,527	41,057	65,907	14,762	129,946	10,577	262,249	49,278	.....	8,600	40,678	—2,731
Chicago, Rock Island & Pacific	7,566[12]	7,556,316	3,596,107	11,840,224	1,839,787	1,610,547	312,088	4,251,728	286,523	8,300,673	3,539,551	—28,822	462,425	3,048,304	974,565
Chicago, St. Paul, Minneapolis & Omaha	1,744	1,623,769	925,294	2,736,351	440,602	368,443	62,355	1,040,761	68,620	1,980,781	755,570	4,040	134,875	624,735	138,448
Chicago, Terre Haute & Southeastern	351	253,061	39,532	300,039	64,658	61,802	5,444	96,988	14,413	243,305	56,734	—285	20,000	36,449	—36,659
Cincinnati, Hamilton & Dayton	1,015	1,339,491	322,199	1,847,878	209,691	306,012	41,835	688,631	36,458	1,282,627	565,251	.....	66,125	499,126	—14,294
Cincinnati, New Orleans & Texas Pacific	337	1,223,804	305,386	1,609,525	171,330	350,045	45,467	461,452	37,445	1,065,739	543,786	—175	51,600	492,011	—94,230
Cincinnati Northern	245[13]	178,916	53,332	244,438	47,096	44,413	5,054	90,713	6,425	193,701	50,737	.....	10,600	40,137	5,533
Cleveland, Cincinnati, Chic. & St. Louis	2,012[14]	3,704,531	1,613,129	5,777,516	726,755	941,851	127,985	2,032,349	110,431	3,939,371	1,838,145	1,895	190,000	1,650,040	39,761
Colorado Midland	338	222,159	73,070	317,519	60,144	73,262	16,041	148,314	11,130	308,897	8,628	—619	13,600	—5,591	—63,265
Colorado & Southern	1,073[15]	919,857	335,706	1,342,293	222,745	301,729	23,679	392,495	42,130	982,778	359,515	—988	58,350	300,177	—107,664
Cumberland Valley	162	389,703	139,133	554,843	106,538	62,343	9,264	162,857	13,858	354,860	199,983	1,141	11,224	189,900	46,435
Delaware & Hudson Co.—R. R. Dept.	854[16]	3,443,306	756,750	4,333,392	339,968	543,913	52,602	1,360,732	104,987	2,402,202	1,931,190	47,570	98,030	1,785,590	173,583
Delaware, Lackawanna & Western	959[17]	4,848,086	1,534,083	6,827,205	991,531	994,012	135,374	1,911,081	128,003	4,160,001	2,667,204	47,388	337,880	2,376,712	234,554
Denver & Rio Grande	2,555	3,015,822	1,063,533	4,272,598	780,925	784,650	101,935	1,296,651	126,402	3,090,563	1,182,035	18,324	145,000	1,055,359	—104,976
Denver, Northwestern & Pacific	215	130,913	109,544	250,833	45,850	33,162	4,381	62,894	7,834	154,121	96,712	.....	7,000	89,712	—23,806
Detroit & Mackinac	411[18]	131,866	75,263	220,827	37,510	28,226	4,886	77,681	5,921	154,224	66,603	2,083	17,419	51,267	75
Detroit, Grand Haven & Milwaukee	191	215,000	128,000	393,350	138,601	51,639	14,078	186,546	9,902	400,766	—7,416	—124	5,906	—13,446	—121,733
Detroit River Tunnel	2	.....	.....	189,074	3,340	5,720	.....	16,471	20	25,551	163,523	.....	9,000	154,523	1,150
Detroit, Toledo & Ironton	441	226,454	31,877	279,751	49,203	27,313	5,207	119,479	10,211	211,413	68,338	—11	12,000	56,327	16,885
Duluth, Missabe & Northern	351[19]	2,094,597	76,235	2,187,512	207,722	171,965	3,997	345,184	21,772	750,640	1,436,872	11,134	105,495	1,342,511	—60,096
Duluth, South Shore & Atlantic	626[20]	400,573	203,171	634,023	135,294	63,884	20,162	219,660	23,338	462,338	171,685	3,817	36,000	139,502	—13,129
El Paso & Southwestern Co	902	1,094,219	160,270	1,310,590	122,524	185,458	25,601	359,046	47,998	740,627	569,963	—3,029	44,476	522,458	190,458
Elgin, Joliet & Eastern	823[21]	2,052,923	14	2,241,641	237,658	321,244	9,053	537,413	31,406	1,136,774	1,104,867	.....	40,666	1,064,201	413,842
Florida East Coast	642[22]	269,322	182,617	525,778	138,947	100,689	9,789	227,939	21,245	498,609	27,169	—1,714	31,000	—5,545	2,940
Fort Worth & Denver City	454	470,699	285,444	795,733	66,576	133,065	17,294	253,764	27,576	498,275	297,458	—1,958	23,400	272,100	—48,473
Galveston, Harrisburg & San Antonio	1,338	1,341,025	513,282	1,946,352	173,685	432,791	61,721	725,441	65,574	1,459,212	487,140	—10,814	69,405	406,921	—49,881
Georgia, Southern & Florida	395	198,183	141,045	389,185	41,986	80,284	13,979	161,056	18,384	315,689	73,496	.....	21,252	52,244	—5,754
Grand Rapids & Indiana	586[23]	512,512	427,592	1,020,115	119,007	142,479	23,809	393,624	30,447	709,366	310,749	36	45,385	265,400	13,189
Grand Trunk Western	347	649,000	445,000	1,167,700	176,060	160,527	40,942	455,528	27,619	860,676	307,024	—1,324	59,754	245,946	—20,229
Great Northern	7,485[24]	9,624,249	2,824,281	13,344,997	2,365,830	1,517,854	188,219	3,231,084	217,814	7,520,801	5,824,196	70,614	572,744	5,322,066	431,932
Gulf & Ship Island	308	232,572	77,729	335,707	46,407	56,086	5,576	91,818	15,991	215,878	119,829	.....	10,185	109,644	20,574
Gulf, Colorado & Santa Fe	1,596[25]	1,377,637	576,684	2,067,798	318,002	293,471	47,799	722,601	62,800	1,444,673	623,125	.....	80,871	542,254	317,704
Houston, East & West Texas	191	140,304	65,942	217,954	28,425	24,763	4,404	71,154	7,569	136,315	81,639	.....	7,976	73,663	7,570
Houston & Texas Central	789	703,362	337,568	1,113,926	115,481	168,028	30,074	432,494	33,704	779,781	335,145	—3,081	39,646	291,418	46,720
Illinois Central	4,763	6,737,903	2,425,182	10,613,411	1,638,083	2,447,233	231,667	4,001,575	255,222	8,573,780	2,039,631	—24,728	475,500	1,539,403	—528,237
Indiana Harbor Belt	105[26]	.....	.....	494,037	55,004	64,631	5,279	184,673	12,046	321,633	172,404	6,977	11,120	168,261	60,161
Kanawha & Michigan	177[27]	535,425	69,735	617,331	80,088	92,009	4,764	165,863	12,243	354,967	262,364	—69	18,516	243,779	10,835
Lake Erie & Western	886	780,252	184,443	1,021,563	166,516	178,846	24,068	360,725	22,123	752,278	269,285	.....	40,990	228,295	—41,283
Lake Shore & Michigan Southern	1,873[28]	6,047,036	2,490,074	9,516,646	1,292,125	1,573,395	163,109	2,740,374	151,745	5,920,748	3,595,898	50,242	290,000	3,356,140	—25,666
Lehigh & Hudson	97	281,527	10,453	296,098	55,025	44,735	2,457	95,072	7,716	205,005	91,093	.....	8,000	83,093	10,894
Lehigh Valley	1,453[29]	6,234,522	1,053,597	7,533,547	946,613	1,281,476	159,351	2,138,148	127,224	4,652,812	2,880,735	—54,354	235,000	2,591,381	503,526

Operated at the end of the previous period—[1] 355; [2] 7,613; [3] 4,500; [4] 4,434; [5] 628; [6] 2,225; [7] 573; [8] 2,242; [9] 7,754; [10] 341; [11] 2,059; [12] 7,551; [13] 246; [14] 2,010; [15] 1,194; [16] 852; [17] 930; [18] 358; [19] 328; [20] 612; [21] 842; [22] 583; [23] 587; [24] 7,345; [25] 1,587; [26] 109; [27] 176; [28] 1,663; [29] 1,429. — Indicates Deficits, Losses and Decreases.

Crop Conditions and Prices.

The crop reporting board of the department of agriculture estimates that the condition of the cotton crop on September 25 was 69.6 per cent. of a normal, as compared with 74.8 on August 25, 1912, 71.1 on September 25, 1911, 65.9 on September 25, 1910, and 67.5, which was the average of the past ten years September 25.

Comparisons of conditions, by states, is shown in the following table:

States.	Sept. 25, 1912.	August 25, 1912.	September 25, 1911.	1910.	10-yr. av.
Virginia	70	80	87	78	76
North Carolina	70	75	77	72	73
South Carolina	68	73	73	70	72
Georgia	65	70	79	68	72
Florida	65	73	75	66	71
Alabama	68	75	73	67	67
Mississippi	63	70	62	63	67
Louisiana	69	74	66	51	62
Texas	75	76	71	63	63
Arkansas	68	77	70	68	69
Tennessee	68	76	77	73	75
Missouri	72	78	80	75	76
Oklahoma	69	84	60	70	68
California	90	95	100	90	..
United States	69.6	74.8	71.1	65.9	67.5

For the purpose of comparison, the condition of the cotton crop in the United States monthly for the past ten years is given below:

Years.	May 25.	June 25.	July 25.	Aug. 25.	Sept. 25.
1911	87.8	88.2	89.1	73.2	71.1
1910	82.0	80.7	75.5	72.1	65.9
1909	81.1	74.6	71.9	63.7	58.5
1908	79.7	81.2	83.0	76.1	69.7
1907	70.5	72.0	75.0	72.7	67.7
1906	84.6	83.3	82.9	77.3	71.6
1905	77.2	77.0	74.9	72.1	71.2
1904	83.0	88.0	91.6	84.1	75.8
1903	74.1	77.1	79.7	81.2	65.1
1902	95.1	84.7	81.9	64.0	58.3
Average, 1902-1911	81.5	80.7	80.6	73.6	67.5

The average prices paid to producers of the United States for articles specified, on October 1, 1912, with comparisons, are shown herewith:

	Oct. 1, 1912.	Sept. 1, 1912.	Oct. 1, 1911.	Oct. 1, 1910.	Oct. 1, 1909.
Corn, per bu.	$.702	$.776	$.657	$.611	$.671
Wheat, per bu.	.834	.858	.884	.937	.946
Oats, per bu.	.336	.350	.425	.362	.410
Barley, per bu.	.548	.535	.817	.561	.534
Rye, per bu.	.701	.708	.797	.728	.728
Buckwheat, per bu.	.697	.766	.696	.713	.750
Flaxseed, per bu.	1.477	1,626	2.050	2.334	1.228
Potatoes, per bu.	.511	.650	.883	.678	.643
Hay, per ton	11.760	12.140	14.500	11.820	10.030
Cotton, per lb.	.112	.113	.102	.133	.126
Butter, per lb.	.256	.242	.238	.262	.250
Chickens, per lb.	.115	.113	.109	.116	.113
Eggs, per doz.	.220	.191	.200	.224	.221
Index figure of average prices*	128.6	137.6	138.0	129.8	130.5

*Index price of above products, excluding butter, eggs and chickens; 100 representing average of the prices on December 1 for 43 years, 1866-1908, inclusive.

The average of farm prices of important crops (corn, wheat, oats, barley, rye, flaxseed, potatoes, tobacco, cotton, and hay, which represent about three-fourths of the value of all crops) declined 6.5 per cent. from September 1 to October 1, which compares with a decline of 2.5 per cent. in the same period last year, and an average decline of 3.1 per cent. during September of the past four years. On October 1 the average of farm prices of the above named crops was about 6.8 per cent. lower than on like date of 1911, 0.9 per cent. lower than in 1910, 1.5 per cent. lower than in 1909 and 1.1 per cent. higher than in 1908, on like dates.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended from October 6, 1912, to February 1, 1913, supplements to the Chicago, Rock Island & Pacific tariff, which supplements withdraw the privilege of shipping grain and grain products with hay, rice straw and straw in mixed carload lots at the highest carload rate and minimum carload weight applying on any articles in the car.

The commission has begun an investigation of the causes of the car shortage in the west. Commissioner Lane gave out an interview in which he said that the commission had received complaints of the serious car shortages in the west while at the same time the commission was informed that there were being held at New York 10,000 cars for export shipments which had been there from 30 to 60 days.

Representatives of a number of the larger railroad companies have asked the commission to be made parties to the investigation into express rates. The railroad attorneys have asked the commission to take additional testimony on the subject of the effect that the proposed reductions by the commission will have on railroad earnings. The commission was also asked not only to hear additional testimony, but to postpone its final orders in the case until it has been seen what effect the government's parcels post will have on express earnings.

Differentials on Grain.

Chamber of Commerce of the State of New York et al. v. New York Central & Hudson River et al. Opinion by Commissioner Clark.

Differentials under New York on all-rail and lake-and-rail export shipments from differential territory to Baltimore should not exceed 3 cents per 100 lbs., and to Philadelphia should not exceed 2 cents per 100 lbs., on the classes and on commodities other than grain. On all-rail and lake-and-rail export shipments of grain the differentials under New York should not exceed 1.5 cents per 100 pounds to Baltimore, and 1 cent per 100 pounds to Philadelphia.

As to all this traffic the export rates to Boston should not be lower than to New York.

The differentials under New York from Buffalo, N. Y., Erie, Pa., and West Fairport, Ohio, to Baltimore and Philadelphia, on ex-lake grain from differential territory for export, should not exceed two-tenths of 1 cent per bu. on barley and oats, and three-tenths of 1 cent per bu. on wheat, corn, and rye.

Differentials under New York on import traffic, all-rail and lake-and-rail, from Philadelphia and Baltimore to differential territory should be no greater than those which existed in the latter part of 1908.

Import rates from Boston should not be lower than from New York. (24 I. C. C. 55.)

STATE COMMISSIONS.

The Michigan railway commission is said to be considering a plan for increasing the demurrage rate on state traffic to $5 a day for the purpose of promoting the early release of equipment in the effort to relieve the stringency of the car shortage.

D. C. McNab has been appointed deputy minister of railways, telegraphs and telephones for the province of Saskatchewan, succeeding S. P. Porter, whose appointment as executive agent on the Grand Trunk Pacific is announced elsewhere in this issue.

The Railroad Commission of the State of California began on October 1 to print its decisions for general distribution. The copies are sent to subscribers weekly. The subscription price is 50 cents a month. The fees will become part of the railroad commission fund.

The Canadian Board of Railway Commissions has ordered the Michigan Central and the Grand Trunk to grant interswitching privileges at Petrolia, Ont.; and the Grand Trunk, the

Canadian Pacific and the Canadian Northern to grant interswitching privileges at Orillia, Ont.

Examiner Burchmore held a hearing at Chicago on October 7, in a case involving the advances in class and commodity rates from points in Trunk Line and Central Freight association territory to Minneapolis, St. Paul and Duluth, which had been suspended by the Interstate Commerce Commission.

COURT NEWS.

The Minneapolis, St. Paul & Sault Ste. Marie Ry., T. E. Sands, its general freight agent, and the Russell-Miller Milling Company, of Minneapolis, were indicted by a federal court jury at Minneapolis on October 4 on charges of rebating in connection with shipments of flour under milling in transit rates.

The Illinois Central and the Chicago, Rock Island & Pacific pleaded not guilty to charges of violating the Hepburn law by giving complimentary passes, when arraigned before Federal District Judge Carpenter at Chicago, on October 2. The Illinois Central was indicted on 53 counts, and the Chicago, Rock Island & Pacific on 38 counts in July, 1908, on charges that they had distributed annual passes to employees of the United Fruit Company.

The New York Public Service Commission, Second district, has brought suit against the town of Oyster Bay to compel it to obey an order of the commission requiring the town to buy certain lands in connection with the elimination of the Duck Pond Road grade crossing of the Long Island Railroad. The carrying out of an order of the commission providing for the elimination of this grade crossing involves the acquisition by the town of certain lands either by purchase or condemnation.

Judge Easterday of the Superior court at Tacoma, Wash., on September 28, rendered a decision dismissing the suit brought by the Northern Pacific against the Washington Public Service Commission and completely sustaining the recent order of the public service commission prescribing distributive class freight rates from Tacoma and Seattle to points in eastern Washington. The railways in applying rates under the original order of the commission, which only named the maximum rates, took into consideration the difference in mileage from Seattle and from Tacoma, whereupon the commission issued a supplemental order that the rates from Tacoma to eastern Washington points should not exceed the rates from Seattle to the same points. This order was attacked by the Northern Pacific. "The same economic conditions that led the railways to give to Seattle, Tacoma and Portland the same rates to eastern Washington points prior to the tariff rates fixed by the Northern Pacific in March, 1912, induced them to make the same rate to Portland that was accorded to Seattle under the first order of the commission," said the court, "and the same economic conditions exist and demand now as much, if not more than ever, the establishment of the same rates between these three cities and eastern Washington points." Judge Easterday disputed the argument made by the railway company that the difference was so slight that it would not militate greatly against Tacoma shippers, and he pointed out that every time a Seattle shipper paid $100 freight, a Tacoma shipper would be compelled to pay $108, and that if this discrimination continued it would inevitably result that all the shipping from Puget Sound to and from eastern Washington would be handled from Seattle instead of being divided between Seattle and Tacoma.

United States Commerce Court.

The court has dismissed the case of the J. W. Thompson Lumber Company against the Interstate Commerce Commission to set aside an order of the commission denying reparation on lumber shipments. This follows the Proctor & Gamble case before the court, in which it was held that the court did not have jurisdiction to set aside a negative order of the commission.

In the case of the Baltimore & Ohio v. the United States to set aside an order of the Interstate Commerce Commission affecting lighterage charges on sugar in New York harbor, the court granted permission to the United States to withdraw its answer and file a motion to dismiss.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

C. R. Welch has been appointed auditor and traffic manager of the San Benito & Rio Grande Valley, with office at Benito, Tex.

Richard Sutro and Harry Bronner have been elected vice-presidents of the Wheeling & Lake Erie, with headquarters at New York.

Herbert A. Taylor, who has been appointed general attorney of the Erie, with headquarters at New York City, as has been announced in these columns, was born at Beverly, N. J., and was educated at Cornell University and at the University of Buffalo Law School. In July, 1899, he entered the service of the Erie Railroad as managing clerk in the legal department, remaining in that position until February, 1904. He was then assistant general solicitor until July, 1912; was later commerce counsel, and now becomes general attorney of the same road, as above noted.

Operating Officers.

G. U. Hess has been appointed assistant superintendent of the Phoenix and Hayden divisions of the Arizona Eastern, with headquarters at Phoenix, Ariz.

C. W. Streeter has been appointed superintendent of terminals of the Kansas City Southern, with headquarters at Kansas City, Mo., to succeed M. J. Sullivan.

C. S. Millard, engineer of track and roadway of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed superintendent of the Michigan division, with headquarters at Wabash, Ind., succeeding S. T. Blizard, retired.

D. W. Hickey has been appointed superintendent of the White River division of the St. Louis, Iron Mountain & Southern, with headquarters at Aurora, Mo. Mr. Hickey heretofore has been acting superintendent of that division.

J. Munday has been appointed general superintendent of the Rock Island Southern, with headquarters at Matherville, Ill. Mr. Munday formerly was superintendent of the Missouri, Kansas & Texas of Texas, at Denison, Tex.

H. F. Anderson, superintendent of the Missouri, Kansas & Texas of Texas, with office at Denison, Tex., has been appointed general superintendent, with headquarters at Denison. He succeeds J. W. Walton, who resigned recently as assistant general manager.

C. C. Walker, assistant general manager of the Chesapeake & Ohio and the Chesapeake & Ohio of Indiana, at Richmond, Va., has been appointed general superintendent of transportation, succeeding E. T. Goodwin, transferred, and his former position has been abolished.

F. Cone, assistant division superintendent of the Chicago, Burlington & Quincy, at Aurora, Ill., has been appointed assistant superintendent of the Hannibal division, with headquarters at St. Louis, Mo., in place of T. K. Knight, who has been made chief clerk in the office of the general superintendent of the Missouri district at St. Louis. N. C. Allen, trainmaster at Ottumwa, Ia., succeeds Mr. Cone as assistant division superintendent, with office at Aurora, Ill.

W. W. Ryder, general superintendent of telegraph of the New York Central lines, with office at Chicago, has resigned to take the position of manager of the railway department of the Western Union Telegraph Company, with office in New York City. Mr. Ryder was born at Aurora, Ill., on April 6, 1865, and entered railway service with the Chicago, Burlington & Quincy in 1883. In 1893 he was appointed superintendent of telegraph on that road, and in 1910 he resigned that place to take a similar position on the New York Central.

Robert A. Barrett, trainmaster of the Toronto, Hamilton & Buffalo, at Hamilton, Ont., has been appointed superintendent, with headquarters at Hamilton. He began railway work as

yardmaster in the Montrose yards of the Michigan Central, and was then promoted to trainmaster for the division east of St. Thomas, with headquarters at Niagara Falls. In 1911 he was appointed trainmaster of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, which position he held until his recent promotion to superintendent of the same road.

S. R. Payne, general superintendent of the Western district of the New York Central & Hudson River, at Syracuse, N. Y., has been appointed assistant to the general manager, with headquarters at Rochester, and will perform such duties as may be assigned to him. T. W. Evans, superintendent of the Buffalo division, at Buffalo, succeeds Mr. Payne. H. E. Brown, acting superintendent at Rochester, succeeds Mr. Evans. L. S. Emery, acting assistant superintendent, at Syracuse, has been appointed assistant superintendent of the Western division, with headquarters at Syracuse, and C. E. Olp, chief signalman has been appointed trainmaster, with headquarters at Syracuse.

H. E. Brown, who has been appointed superintendent of the Buffalo division of the New York Central & Hudson River with headquarters at Buffalo, N. Y., was born on April 1, 1867, at Cooperstown, N. Y., and was educated in the common schools. He began railway work on March 1, 1888, with the Fitchburg Railroad, now a part of the Boston & Maine, and until December, 1890, was an operator and train despatcher on that road. From December 22, 1890, to October 1, 1912, he was consecutively train despatcher, chief train despatcher, trainmaster and assistant superintendent of the New York Central & Hudson River, and now becomes superintendent of the Buffalo division of the same road, as above noted.

H. F. Reddig, trainmaster of the Chicago, Rock Island & Pacific at Haileyville, Okla., has been appointed acting superintendent of the Indiana Territory division, with headquarters at Haileyville, succeeding D. Coughlin, who has been appointed superintendent of the Missouri division, with headquarters at Trenton, Mo., in place of M. J. Kennelly. Mr. Coughlin has been with the Chicago, Rock Island & Pacific since March, 1906, when he was made trainmaster of the Kansas division. He was promoted to the superintendency of the Indiana Territory division on December 15, 1909, and is now transferred to the Missouri division as superintendent. Previous to his connection with the Rock Island, Mr. Coughlin was with the Atchison, Topeka & Santa Fe successively as agent, train despatcher, chief despatcher and trainmaster.

G. S. Waid, superintendent of the El Paso division of the Galveston, Harrisburg & San Antonio, at El Paso, Tex., has been appointed assistant general manager of the Galveston, Harrisburg & San Antonio, the Texas & New Orleans; the Houston & Texas Central; the Houston East & West Texas, and the Houston & Shreveport, with headquarters at Houston, Tex., succeeding G. Radetzki, resigned. R. M. Hoover, superintendent of the First division of the Houston & Texas Central, at Ennis, succeeds Mr. Waid. D. S. Gallagher, superintendent of transportation of the Houston East & West Texas, and the Houston & Shreveport, succeeds Mr. Hoover, and his former position has been abolished. R. T. Walker, trainmaster of the Houston East & West Texas Railway and the Houston & Shreveport at Houston, Tex., has been appointed superintendent of both these companies, succeeding to the duties of Mr. Gallagher.

H. R. Laughlin, who has been on the staff of the general manager of the Baltimore & Ohio with headquarters at Baltimore, Md., since October 1, 1911, has been appointed superintendent of the new Sandy Valley & Elkhorn division with headquarters at Jenkins, Ky. On October 1, the B. & O. took over the Sandy Valley & Elkhorn Railroad, a new line to the coal mines of the Consolidated Coal Company, in the Elkhorn district of eastern Kentucky, and formed the new division, which will be operated under the supervision of W. C. Loree, general manager of the B. & O. Southwestern, and the Cincinnati, Hamilton & Dayton. Mr. Laughlin entered the service of the B. & O. in February, 1884, as a telegraph operator at Oakland, Md. Three years later he was promoted to train despatcher at Grafton, W. Va., and became division operator of the Wheeling division at Wheeling, in July, 1900. He was made trainmaster of the Monongah division at Grafton, in October, 1902, and was promoted in May, 1910, to superintendent. In October, 1911, he was appointed on the staff of the general manager with headquarters at Baltimore, which position he held at the time of his recent appointment as above noted.

Edwin C. Keenan, whose appointment as general superintendent of telegraph of the New York Central Lines west of Buffalo, jointly representing the railways and the Western Union Telegraph Company, with headquarters at Chicago, has been announced in these columns, was born April 20, 1868, at Toledo, Ohio. He entered telegraph service August 3, 1885, as a railway telegrapher, and filled positions at various small stations and in the despatcher's office at Detroit, Mich., and Toledo, Ohio. In 1892 he became clerk in the engineering department of the Lake Shore & Michigan Southern at Toledo and was transferred to the general offices of the engineering department at Cleveland in 1900, remaining there until 1901, when he became chief clerk in the engineering department of the Lake Erie & Western at Indianapolis, Ind. He returned to the engineering department of the Lake Shore at Cleveland as chief clerk in 1905 and early in 1910 was advanced to superintendent of telegraph of that road, which position he held until his recent appointment as general superintendent of telegraph, as above noted. Mr. Keenan succeeded W. W. Ryder, who has been made manager of the railway department of the Western Union Telegraph Company, with office at New York City.

H. O. Halsted, heretofore superintendent of transportation of the Pere Marquette, has been appointed superintendent of the Detroit division, with headquarters at Detroit, Mich. This division, which has just been created, comprises the line Detroit to Grand Rapids, including Detroit terminals and Detroit-Windsor ferry operation. Mr. Halsted was born February 5, 1863, at Milwaukee, Wis. He was educated in the public schools, and began railway work with the Union Pacific in 1884. He remained with that road until 1893, filling the positions of clerk, operator, train despatcher, trainmaster and assistant superintendent. He then became train despatcher of the Flint & Pere Marquette. He later was made agent at Port Huron, Mich., and subsequently was superintendent of the Duluth, Mississippi River & Northern during 1895 and 1896. He then returned to the Pere Marquette as agent at Toledo, Ohio, and on May 1, 1902, was promoted to chief train despatcher at Grand Rapids, Mich. From August, 1903, to November of that year he was trainmaster of the Chicago division and was made superintendent at Plymouth, Mich., on the latter date. He was appointed superintendent of terminals at Chicago on March 1, 1905, became superintendent of transportation, with headquarters at Detroit, Mich., on December 1, 1910, and is now made superintendent of the Detroit division, as above noted.

Traffic Officers.

A. L. Gilbert, local agent of the Wabash at Ft. Wayne, Ind., has been appointed commercial agent, with headquarters at Ft. Wayne.

Albert E. Lingham has been appointed traffic agent for the Texas & Pacific and International & Great Northern, with headquarters at Liverpool, Eng.

A. T. Cleveland has been appointed traveling freight and passenger agent of the Sunset-Central lines of the Southern Pacific, with office at Beaumont, Tex.

H. Hamilton has been appointed soliciting freight agent of the St. Louis Southwestern, with headquarters at Houston, Tex., to succeed W. V. McMasters, resigned.

C. H. Reeder, who recently resigned as trainmaster of the Missouri Pacific at Little Rock, Ark., has been appointed manager of the Railway Bureau of the Chamber of Commerce at Little Rock.

T. T. Webster has been appointed chief of tariff bureau of the Michigan Central and Detroit & Charlevoix, with headquarters at Detroit, Mich., succeeding J. L. O'Brien, resigned. Effective October 1.

K. J. Edmondson, assistant general freight and passenger agent of the Guayaquil & Quito, has been appointed general freight and passenger agent, with headquarters at Quito, Ecuador, succeeding C. W. H. Taylor, resigned.

C. R. Alvarez, soliciting freight agent of the Seaboard Air Line at Tampa, Fla., has been appointed contracting freight agent with office at Jacksonville, succeeding R. H. Dozier, re-

signed to accept service with another company, and J. D. Mills succeeds Mr. Alvarez.

T. J. Cumming has been appointed traveling freight agent of the Georgia Southern & Florida, with headquarters at Cordele, Ga., succeeding P. O. Lee, assigned to other duties. H. C. Montague has been appointed soliciting freight agent, with headquarters at Tampa, Fla.

George E. Marsters has been appointed New England passenger agent of the Missouri, Kansas & Texas, with headquarters at Boston, Mass. The office of A. L. Crow, district passenger agent, formerly located at Chattanooga, Tenn., hereafter will be at Nashville, Tenn. Effective October 1.

The New England passenger agency of the Chicago & Alton at Boston, Mass., has been abolished and Frank Bowman, eastern passenger agent, with headquarters at New York, will have jurisdiction over that territory. W. H. Doll has been appointed traveling passenger agent, with office at New York. Effective October 1.

Charles Rudolph, assistant general passenger agent of the Mobile & Ohio, has been appointed general passenger agent, with office at St. Louis, Mo., succeeding John M. Beall, resigned to accept service elsewhere. H. H. Rauth has been appointed assistant general passenger agent, with office at St. Louis, Mo., succeeding Mr. Rudolph.

The following appointments are announced on the Toledo, St. Louis & Western: J. A. Fitzpatrick, general agent, with office at Pittsburgh, Pa., effective September 18; W. J. Klingman, commercial agent, with headquarters at Cleveland, Ohio, effective October 1; J. S. Henney, contracting agent at Cleveland, effective September 21.

Charles Shackell, commercial agent of the Ft. Dodge, Des Moines & Southern, with office at Des Moines, Ia., has been appointed assistant general freight agent, with headquarters at Boone, Ia. F. M. Steele, commercial agent of the Chicago Great Western at Des Moines, succeeds Mr. Shackell as commercial agent at Des Moines.

F. S. Fisher, traveling freight and passenger agent of the Texas Central at Waco, Tex., has been appointed commercial agent of the Missouri, Kansas & Texas of Texas, at Waco, Tex., succeeding O. C. Thomas, who has been transferred to Wichita Falls, Tex., as commercial agent, in place of H. D. Snepp, assigned to other duties. W. D. Morgan has been appointed commercial agent at Ft. Worth, Tex., to succeed J. W. White, transferred.

H. C. Watson, division freight agent of the Buffalo, Rochester & Pittsburgh, at Pittsburgh, Pa., has been promoted to assistant general freight agent, with office at Pittsburgh. G. A. Bowman, division freight agent at Buffalo, N. Y., has been promoted to assistant general freight agent, with office at Buffalo. C. L. Bishop, chief of the tariff bureau at Rochester, has been promoted to assistant general freight agent, with office at Rochester, and the headquarters of William J. Sheridan, traveling freight agent, at Rochester, are now at Toronto, Ont.

F. A. Eisminger has been appointed commercial agent of the Toledo, St. Louis & Western, with headquarters at Kansas City, Mo. E. C. Ferguson has been appointed traveling freight agent, with office at Kansas City. Effective October 15. The jurisdiction of E. M. Davis, division freight agent, with headquarters at Frankfort, Ind., has been extended to include all points east of Edwardsville, Ill., to Maumee, Ohio, inclusive. J. P. Grant has been appointed traveling freight agent, with office at Detroit, Mich. Effective October 1.

J. B. Payne, commercial agent of the Texas & Pacific at Chicago, has been appointed chief clerk to N. M. Leach, who is traffic manager of the Texas & Pacific and assistant to president of the International & Great Northern, with headquarters at New Orleans, La. T. B. Moss, commercial agent of the Texas & Pacific at Birmingham, Ala., has been appointed commercial agent with headquarters at Pittsburgh, Pa., succeeding James Stuart, who has been transferred to Chicago in place of Mr. Payne. Anson Pratt succeeds Mr. Moss as commercial agent at Birmingham. Lee Francis has been appointed traveling passenger agent, with office at Ft. Worth, Tex., succeeding J. A. Chilton, who has been appointed district passenger and ticket agent, with headquarters at El Paso, Tex., in place of A. S. Wagner, resigned to engage in other business.

Engineering and Rolling Stock Officers.

John R. Reeves has been appointed traveling engineer of the Guayaquil & Quito, Ecuador, succeeding F. B. Wilmot, resigned.

J. F. Hill, shop superintendent of the Wheeling & Lake Erie at Brewster, Ohio, has been appointed master mechanic, with headquarters at Brewster, succeeding J. E. O'Hearne, resigned.

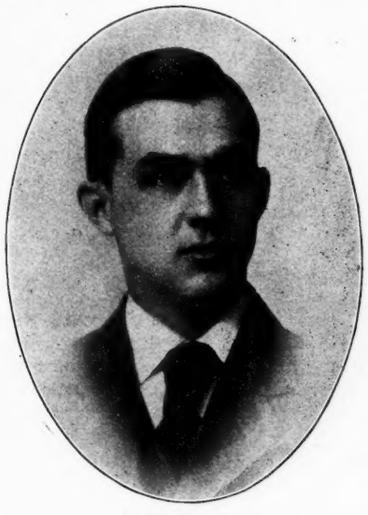
Robert C. Falconer, division engineer of the Erie at Jersey City, N. J., has been appointed principal assistant engineer of lines east of Salamanca, N. Y. He will also have charge of the drafting room and cement testing bureau, with headquarters at New York.

The headquarters of W. L. Kellogg, superintendent of motive power of the Pere Marquette, have been removed from Detroit, Mich., to Wyoming. W. A. Chamberlin has been appointed master mechanic, with office at Saginaw, Mich., in place of F. C. Pickard, resigned. Effective October 1.

H. M. Hutton has been appointed master mechanic of the Monongah division of the Baltimore & Ohio, with headquarters at Grafton, W. Va., succeeding B. H. Hawkins, resigned. P. Coniff has been appointed assistant superintendent of shops at Mount Clare, Baltimore, Md., and J. W. Adams has been appointed general foreman at Mount Clare.

J. F. Deimling, chief engineer of the Pere Marquette, has been appointed engineer of construction of the Michigan Central, with headquarters at Detroit, Mich. A. L. Sarvey has been appointed assistant chief engineer of the latter road, with office at Detroit, succeeding F. B. Marble, resigned. E. M. Walker succeeds Mr. Sarvey as grade separation engineer, with office at Detroit. Effective October 1.

A. M. Darlow, whose appointment as superintendent of motive power of the Buffalo & Susquehanna Railroad and the Buffalo & Susquehanna Railway has been announced in these columns, began railway work as an apprentice on the Vandalia Railroad. He subsequently went to Cornell University and graduated in the class of 1906. He was then appointed special apprentice and shop draftsman on the Chicago & Eastern Illinois, and in 1910 was made roundhouse foreman of the Chicago terminal of the Chicago & Eastern Illinois, at Dalton, Ill. The following year he was transferred as roundhouse foreman to Danville, and in May, 1911, he was appointed mechanical engineer of the Buffalo & Susquehanna Railroad and the Buffalo & Susquehanna Railway, becoming mechanical engineer and general storekeeper of these companies in April, 1912, which position he held at the time of his recent appointment as superintendent of motive power in charge of the mechanical and store departments.



A. M. Darlow.

Special Officers.

S. P. Porter, who has been appointed executive agent of the Grand Trunk Pacific, with headquarters at Regina, Sask., was born in 1870, at Somersetshire, Eng., and came to Canada in 1886. He began railway work in 1889, with the Canadian Pacific, as trainman. From 1901 to 1907, he was homestead inspector for the Dominion government, and in 1908 he was deputy minister of railways, telegraphs and telephones for Saskatchewan, which position he resigned some months ago.

OBITUARY.

James Stephen Norris, general manager of the Maryland & Pennsylvania, died on October 4 at St. Joseph's Hospital, Baltimore, Md.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Central of Peru is inquiring for 6 locomotives.

The Santa Fe, Prescott & Phoenix is inquiring for 3 locomotives.

The Carnegie Steel Company, Pittsburgh, Pa., is inquiring for 1 locomotive.

The Louisiana & Pine Bluff has ordered 1 Mogul locomotive from the Baldwin Locomotive Works.

The New York, New Haven & Hartford has ordered 6 Pacific locomotives from the Baldwin Locomotive Works.

The Susquehanna & New York has ordered 1 consolidation locomotive from the Baldwin Locomotive Works.

The Detroit Iron & Steel Company has ordered 1 four-wheel saddle tank locomotive from the American Locomotive Company. The dimensions of the cylinders will be 16 in. x 24 in.; the diameter of the driving wheels will be 46 in., and the total weight in working order will be 89,000 lbs.

The Denver & Rio Grande has ordered six Pacific type passenger locomotives from the Baldwin Locomotive Works. They will be equipped with superheaters. The diameter of the cylinders will be 26 in. x 26 in., the diameter of the driving wheels will be 67 in., and the total weight in working order will be 262,000 lbs.

The Pittsburgh Steel Company, Monessen, Pa., mentioned in the *Railway Age Gazette* of October 4, as being in the market for 1 locomotive, has ordered 1 six-wheel switching locomotive from the American Locomotive Company. The dimensions of the cylinders will be 21 in. x 26 in.; the diameter of the driving wheels will be 52 in., and the total weight in working order will be 154,000 lbs.

CAR BUILDING.

The Northern Pacific is in the market for 500 miscellaneous cars.

The Grand Trunk is in the market for about 100 passenger cars.

The Merchants Despatch is in the market for 1,000 refrigerator cars.

The Canadian Pacific has ordered 60 sleeping cars from the Pullman Company.

The Missouri, Kansas & Texas has ordered 3 dining cars from the Pullman Company.

The Wells-Fargo & Company Express has ordered 30 express cars from the American Car & Foundry Company.

The Baltimore & Ohio has ordered 500 steel underframes from the Pressed Steel Car Company, and 500 steel underframes from the Ralston Steel Car Company.

The San Pedro, Los Angeles & Salt Lake, mentioned in the *Railway Age Gazette* of September 20, as figuring on 350 box cars, has ordered this equipment from the Pullman Co.

IRON AND STEEL.

The Erie Railroad has ordered between 33,000 and 34,000 tons of rails.

The Chicago, Milwaukee & St. Paul is in the market for 8,000 tons of rail.

The Duluth & Iron Range has ordered 2,500 tons of rails from the Illinois Steel Company.

MACHINERY AND TOOLS.

The Illinois Central will soon issue a long list of requirements for machine tools.

The Chicago, Rock Island & Pacific is in the market for a number of machine tools.

The Chicago, Milwaukee & St. Paul is in the market for a large number of machine tools.

Supply Trade News.

William Horace Corbin, vice-president of The Joseph Dixon Crucible Company, Jersey City, N. J., died on Wednesday, September 25.

S. F. Bowser & Company, Fort Wayne, Ind., announce that E. H. Briggs has been added to their sales staff in the railroad department. He will cover the southwest territory.

E. G. Buckwell, secretary and manager of sales of the Cleveland Twist Drill Company, Cleveland, Ohio, sailed on the Carmania on October 5 for a business trip abroad of about two months' duration.

The Titanium Alloy Manufacturing Company, because of the rapidly increasing demand for its products, has found it necessary to remove its general sales department to the works at Niagara Falls, N. Y., and has created a district office at Pittsburgh, Pa.

W. D. Matthews, a director of the Canadian Pacific Railway Company, has been elected a vice-president of the Canadian General Electric Company, to fill the vacancy caused by the death of H. P. Dwight, president of the Great North Western Telegraph Company.

William Wharton, Jr. & Company, Inc., Philadelphia, Pa., announce the merger of its interests and the Taylor Iron & Steel Company, of High Bridge, N. J. It will continue under the name of Wm. Wharton, Jr. & Company, Inc., while the Taylor Iron & Steel Company will hereafter be known as the Taylor-Wharton Iron & Steel Company.

R. T. McCormick has resigned as a director and the manager of sales of The Petroleum Iron Works Company, Sharon, Pa., and has accepted a position of sales manager with the Knox Pressed and Welded Steel Company, Farmers' Bank building, Pittsburgh, Pa. This company makes a specialty of heavy steel plate construction.

Kern Dodge, the well-known engineer of Philadelphia, has returned from a year's travel abroad, and announces the opening of an office in the Morris building, Philadelphia, Pa., where he will devote himself henceforth to the engineering and financing of public service properties. Mr. Dodge was one of the founders, and for many years one of the partners of the well-known engineering firm, Dodge & Day. His new offices are in the suite with the banking firm of William A. Read & Co.

TRADE PUBLICATIONS.

Locomotive Cranes.—The Ohio Locomotive Crane Company, Bucyrus, Ohio, has just issued its catalog No. 6 describing its cranes. The catalog is handsomely illustrated with a great number of good photographs, and contains in addition pen and ink drawings of cranes, with dimensions, etc. The parts are described and illustrated. The booklet as a whole is very attractively gotten up.

Mallet Articulated Locomotives.—In Record No. 72 from the Baldwin Locomotive Works, Philadelphia, Pa., is found an excellent discussion of the advantages of the articulated type of locomotive in general, as well of the detail parts as designed by this company. Phantom views make the arrangement of piping and steam passages easily understood, and locomotives both with and without reheaters and feed water heaters are shown in this manner. Drawings and photographs of some of the more important details are also included. Several pages are devoted to instructions in the proper method of handling articulated locomotives. It is stated that if the wheels of the forward group slip frequently while those of the rear group do not, it is an indication that steam is leaking past the high pressure valves and that these should be examined for blows. Other similar instructions for break downs or troubles peculiar to this type are clearly explained. The latter half of the book is given up to descriptions, illustrations and dimensions of many different designs of articulated locomotives built by the Baldwin Works.

Railway Construction.

New Incorporations, Surveys, Etc.

Alexander & Eastern.—According to press reports surveys have been made for an extension along Back Fork to Elk river, W. Va., 12 miles.

Atchison, Topeka & Santa Fe.—The report of this company for the year ended June 30, 1912, shows that the Dodge City & Cimarron Valley, which was organized to construct a line extending from Dodge City, Kan., in a southwesterly direction, has been finished on about 60 miles. An additional 60 miles will be constructed during the present fiscal year. The Galveston Causeway, having a total length of 10,642 ft., connecting Galveston Island with the Texas main land, was formally opened for traffic in May, 1912. The Northwestern Pacific in northern California owned by the Santa Fe, and the Southern Pacific is building a link connecting certain of these properties between Willetts and Shively, Cal., 105.67 miles. Construction has been finished on 39.52 miles, and work is now being pushed on the remaining 66.15 miles. When this work is completed the Northwestern Pacific will have a continuous line from Sausalito on San Francisco Bay to Eureka and Trinidad in Northern California, which with its branch lines will make a total of 511.67 miles. The Port Bolivar Iron Ore Railway, 30 miles long, constructed by private parties to develop certain iron ore properties north of Longview, Tex., is now being operated by the Santa Fe. In West Texas the entire line between Coleman and Lubbock has been finished and was opened for traffic on December 1, 1911; the line from Lometa to Eden was completed during the year and opened for traffic January 1, 1912. The extension of the Coleman-Lubbock line from the latter point to Texico, N. M., 89 miles, it is expected will be completed and opened for traffic by the close of the present fiscal year. The construction of this extension will complete the new through line between the Pacific coast and the Gulf of Mexico via Belen and Texico. The mileage of second track in operation on June 30, 1912, was 801.90 miles as compared with 687.58 miles at the close of the preceding fiscal year, being an increase of 114.32 miles. Second track work is now in progress as follows: Missouri division, Floyd to Sibley, Mo., 3.63 miles; lines west to Albuquerque, Rito to Daguna, N. M., 9.16 miles; Baca to Perea, N. M., 27.49 miles; Crookton to Seligman, Ariz., 10.36 miles; Seligman to Yampai, Ariz., 22.77 miles; Topock, Ariz., to Needles, Cal., 11.75 miles, and Keenbrook to Highland Junction, Cal., 12.62 miles, a total of 97.78 miles. The second track work on the Missouri division is being carried on in connection with the reconstruction of the bridge over the Missouri river at Sibley, which it is expected will be completed by the close of the current fiscal year. All the work in progress on the lines west of Albuquerque will be completed by January 1 next, making a total on that date of 896.05 miles of second track in operation.

Baltimore & Ohio.—The Elkhorn & Sandy Valley, running from Shelby, Ky., where it connects with the Chesapeake & Ohio, south to Jenkins, 32 miles, with 8 miles of sidings, through a coal section belonging to the Consolidated Coal Company, in Letcher, Pine and Knott counties, has been finished. It is laid with 90-lb. rails, has 44 steel and concrete bridges and has a maximum grade of only 1½ per cent. On October 1 the line was taken over by the Baltimore & Ohio.

British Columbia Roads.—Application has been made to the British Columbia legislature for incorporation by a company which proposes to build from the Nechaco river, near Fort George, southeasterly to the Fraser river, along the valley of that river to Six Mile creek, thence easterly and southeasterly to Willow river, then northeasterly to Bear river, and then southeasterly to Barkerville, B. C. Burns & Walkem, Vancouver, B. C., are solicitors for the applicants.

Canadian Northern.—The general route maps for the Canadian Northern Ontario line, to have a total of 17 miles on Montreal Island, have been approved. These lines will form part of the through line between Montreal and Hawksbury, which is now under construction.

It is understood that contracts will be let soon for building the section from Toronto, Ont., to Hamilton, and that grading work will be finished during 1912 from Poplar Plains road, North Toronto, to the west side of the Humber river at Lambton.

Canadian Northern Pacific.—An act has been passed by the Dominion parliament granting aid to this company for the construction of the line from the mouth of the Fraser river, B. C., northeast to Yellow Head Pass, 525 miles. Surveys are now being made for a branch from near Kamloops to the Okanagan valley. It is understood that the company has arranged with the city officials of Vancouver, B. C., to put up a passenger terminal and locate its freight yard at that place; also to put up a freight terminal at Port Mann, together with repair shops, roundhouses, etc. The Vancouver city terminal is to be reached by a tunnel. It is expected that the improvements in Vancouver will be completed in three years. (July 28, p. 198.)

Canadian Pacific.—An officer writes that contracts have been let for the extension of the Esquimalt & Nanaimo along the east coast of Vancouver Island, 45 miles, from Parksville, B. C., near Nanoose bay to Comax as follows: To Cullerton Brothers, Spokane, Wash., for 15 miles; to C. Hoard, Victoria, B. C., for 10 miles, and contracts for work on 20 miles are to be let at once. There will be seven steel bridges varying in length from 60 ft. each to 80 ft., and 10 large trestles which will later be filled.

Surveys are completed for the double-tracking between Calgary, Alberta and the Pacific coast, and work will be commenced at 12 points on the route within six months. The construction will be pushed to completion, and it is expected that the work will be completed about the time that the Panama Canal is opened for traffic. The second track will have easier grades than the present main line.

Cheat Haven & Bruceton.—An officer writes that a contract has been given to the West Virginia Power and Development Company, to build a 20-mile line from Cheat Haven, Pa., and work is now under way. The work involves putting up a large number of trestles and making side cut excavations. The line is being built to carry lumber, coal and merchandise. Frank Cunningham, 812 House building, Pittsburgh, Pa., may be addressed.

Cincinnati, Nashville & Southern.—Incorporated in Tennessee with $25,000 capital, to build from Algood, Putnam county, Tenn., northeast to Livingston in Overton county, about 20 miles. The incorporators include C. R. Young, A. Handley and W. H. Thompson.

Dallas Southern Traction.—See Southern Traction.

Dominion Atlantic.—Plans of the revised location for the line across Gaspereaux river just east of Horton Landing, Nova Scotia, and plans for the substructure of the proposed bridge over the same river have been approved by the Board of Railway Commissioners of Canada. A subsidy has also been granted for the construction of a line not to exceed 15 miles long from Centreville, N. S., west to Weston.

Erie, London & Tillsonburg.—See Grand Trunk.

Elkhorn & Sandy Valley.—See Baltimore & Ohio.

Esquimalt & Nanaimo.—See Canadian Pacific.

Flemington, Hinesville & Western.—An officer is quoted as saying that this company has completed five miles from McIntosh, Ga., via Flemington to Hinesville, and that the line is to be extended to Glenville, 20 miles. J. D. Way, Hinesville, is president and general manager. (August 16, p. 329.)

Florida Interurban Railway & Tunnel Company.—Application has been made in Florida for a charter, it is said, by this company, with a capital of $2,000,000. The plans call for building from Jacksonville, Fla., east to Pablo Beach, thence south to St. Augustine, about 45 miles, including branches There is to be a double track tunnel about one-third of a mile long between Jacksonville and South Jacksonville, under the St. Johns river. It is expected that construction work will be started about the first of next year. M. W. Bates, president; William R. Letcher, secretary, Jacksonville.

Grand Trunk.—This company has bought the charter and rights of the Erie, London & Tillsonburg and construction

work has been started from a point a short distance north of Port Burwell, Ont.

GRAND TRUNK PACIFIC.—According to press reports Patrick Welch, of Foley, Welch & Stewart, has resigned from the vice-presidency of the Pacific & Great Eastern, and has been given a contract to build the line from North Vancouver, B. C., to the Grand Trunk Pacific main line. Mr. Welch will have his headquarters at Lilloet, and will begin the work at once.

GREAT NORTHERN.—A contract is said to have been given to Guthrie McDougall & Company for building about 42 miles between Coalmont, B. C., and Coquahalla Summit on the Vancouver, Victoria & Eastern. (September 13, p. 491.)

HA HA BAY RAILWAY.—The Department of Railways of Canada has entered into a contract with this company for building the following lines: From a junction with the Quebec & Lake St. John Railway in Jonquiers township, to St. Mathias, Quebec, not exceeding 20 miles; from La Crosse Junction to the Saguenay river, northerly through Chicoutimi, not exceeding five miles; from La Terriere Junction, southerly via La Terriere village to Lake Kenogami, not exceeding 10 miles; from the existing line near Bagotville, easterly to St. Alexis, not exceeding 3 miles.

HUDSON BAY RAILWAY.—The Canadian government has given a contract to J. D. MacArthur, Winnipeg, Man., for building the last section of the Hudson Bay Railway from Split Lake Junction, Keewatin, to Port Nelson on Hudson Bay. (August 30, p. 409.)

INTERPROVINCIAL & JAMES BAY.—The route maps for this line projected from the terminus of the Kipawa branch of the Canadian Pacific at Kipawa, Quebec, northerly for 54 miles have been approved.

LONDON & PORT STANLEY.—Negotiations are under way to lease this line to the Lake Erie Coal Company, the latter company agreeing to spend $400,000 on the electrification of the line for a 25-year lease. It is proposed to put up some new freight sheds and a station at Port Stanley, Ont. About 22 acres of land has been bought at that place for an extension of the freight yard.

NEW YORK, NEW HAVEN & HARTFORD.—This company has decided to proceed immediately with the development of the Westchester Northern, which has been projected for some time. The cost of building the line will be between $6,000,000 and $7,000,000. The plans call for a line from the White Plains, N. Y., terminal of the New York, Westchester & Boston northerly through Harrison, North Castle, Bedford, Pound Ridge and Lewisboro in Westchester county, and through Greenwich, Ridgefield and Danbury in Connecticut to a connection with the New York, New Haven & Hartford in Danbury. The completion of the Westchester Northern will add greatly to the New Haven system's facilities. It will make it practicable to interchange traffic to and from the Berkshire district with the New York, Westchester & Boston, shortening the express schedule to the Berkshire district by about 35 minutes.

NORTH YAKIMA & VALLEY.—This company asked for bids recently, it is said, to build a three mile extension in Yakima county, Wash.

PACIFIC & GREAT EASTERN.—See Grand Trunk Pacific.

PIEDMONT & NORTHERN LINES (ELECTRIC).—An officer writes that 23 miles are now in operation from Charlotte, N. C., to Gastonia, for both freight and passenger service, also from Greenwood, S. C., to Anderson, 42 miles. From Belton, S. C., to Greenville, 27 miles, the grading and bridging are completed, with the track laid on over 20 miles. From Greenville to Spartanburg, on another division, 30 miles is under contract, and is being rapidly pushed to completion. The maximum grades will be 1 per cent. compensated for curve resistance. The least radius of curvature will be 955.4 ft. The bridges are heavy, Cooper's E-55. All openings are covered with concrete culverts or steel structures and 80-lb. rail is being used. (August 16, p. 329).

QUEBEC & SAGUENAY.—A contract under the act granting subsidies to railways has been entered between this company and the Department of Railways and Canals of Canada, to build 62.8 miles from St. Joachim, Quebec, northeasterly. O. B. Daoust is president, Quebec.

ST. LOUIS, BROWNSVILLE & MEXICO.—See St. Louis & San Francisco.

ST. LOUIS & SAN FRANCISCO.—An officer writes regarding the work to be carried out on the St. Louis, Brownsville & Mexico that the company intends to build at once about 30 miles of additional side tracks and spurs.

SOUTHERN RAILWAY.—The report of this company for the year ended June 30, 1912, shows that construction of the double-track line north of Atlanta, between Crosskeys and Gainesville, Ga., has progressed during the year. A substantial part of it has been placed in service. It is expected that this work will be completed by January 1, 1913. With the completion of this work between Crosskeys and Gainesville, the company will have in operation on its main line between Washington and Atlanta 288.35 miles of double-track. Construction of the double-track, and revision of grades and alinement on the main line south of Franklin Junction, Va., were completed and placed in operation during the year. The lap-sidings between Atlanta and Macon, Ga., Knoxville and Chattanooga, Tenn., and two of the three projected between Morristown, Tenn., and Asheville, N. C., were completed and placed in operation during the year. The system of lap-sidings has been extended to the line between Macon and Jesup, Ga., and there were in course of construction at the close of the year ten such sidings, the aggregate length of which will be approximately 18,714 feet. Construction of an additional track between Constitution and Roseland, Ga., a distance of 2.82 miles, was begun during the year, and, when completed, there will be about 7 miles of double-track between Atlanta and Constitution, Ga. On the Knoxville River front extension it is expected that the track will be ready for operation by January 1, 1913. A new double-track connection with the Cincinnati, New Orleans & Texas Pacific at Citico Junction, Tenn., equipped with interlocking signals, is in course of construction. When completed, this track will afford more prompt and direct movement of passenger trains in and out of the union passenger station at Chattanooga, Tenn. It is expected that this connection will be finished during 1912. A belt line is in course of construction at High Point, N. C.

SOUTHERN TRACTION.—According to press reports this company has bought the rights and property of the Dallas Southern Traction, building a line for the Stone & Webster Management Association, Boston, Mass., between Dallas, Tex., and Waxahachie, 30 miles. It is understood that this is to form a section of a line now under construction from Dallas to Waco and to Corsicana. J. F. Strickland, of Dallas, president of the Southern Traction, is quoted as saying that about 75 miles of the roadbed has been finished and satisfactory progress is being made building the necessary bridges and trestles. A contract has recently been given for 14 steel bridges to be put up on the line. (September 20, p. 559.)

TEXAS MIDLAND.—Negotiations are under way, it is said, for the purchase of the Texas State Railroad operating from Palestine, Tex., east to Rusk, 32 miles. It is proposed to extend the Texas Midland from Ennis southeast to Palestine, about 75 miles, and to extend the Texas State from Rusk southeast. The Texas Midland is now in operation from Paris southwest to Ennis, 124 miles.

TEXAS ROADS (Electric).—Plans are being made to build an interurban line from Longview, Tex., northeast via Marshall to Caddo lake, thence southeast to Shreveport, La., about 65 miles. A branch may be built to Jefferson, Tex., which is about 20 miles north of Marshall. Financial arrangements are said to be made to carry out the surveys and to start the work. C. T. Morgan, R. G. Brown and W. K. Eckman, all of Longview, are interested.

TEXAS STATE.—See Texas Midland.

TRINITY VALLEY TRACTION.—An officer is quoted as saying that financial arrangements have been made to build from Dallas, Tex., south via Waxahachie, Hubbard, Marlin, Cameron and Taylor, to Austin, about 235 miles. It is expected that construction work will be started before January, 1913. J. B. Watkins is president, Dallas.

VANCOUVER, VICTORIA & EASTERN.—See Great Northern.

WESTCHESTER NORTHERN.—See New York, New Haven & Hartford.

RAILWAY STRUCTURES.

ATLANTA, GA.—The report of the Southern Railway for the year ended June 30, 1912, shows that work has progressed during the year on the new inbound freight station and office building at Atlanta, Ga. The freight facilities are now in operation, and the offices will be ready for occupancy early in 1913. The Memphis Union Station Company, formed for the purpose of constructing adequate passenger terminal facilities at Memphis, Tenn., for the joint use of the Southern Railway and four other companies entering Memphis, has been completed and was placed in operation on April 1, 1912.

BOZEMAN, MONT.—The Gallatin Valley is planning the erection of a roundhouse.

CARLTON, MINN.—The Northern Pacific is planning to build a 40-stall roundhouse, machine shops and division offices at this point.

CHARLOTTE, N. C.—See Piedmont & Northern Lines under Railway Construction.

CHICAGO.—The railways interested in the proposed new Union passenger station have purchased the property of the Chicago Dock Company adjacent to the south branch of the Chicago river and on the north side of Taylor street for $3,500,000. It is to be used for freight terminal purposes.

GALVESTON, TEX.—Contracts are to be let shortly for a six-story passenger station and office building for the Gulf, Colorado & Santa Fe, to cost about $500,000.

LUDLOW, KY.—The Cincinnati, New Orleans & Texas Pacific is building a roundhouse and coaling station of concrete construction.

SHREVEPORT, LA.—Bids are wanted by L. H. Baker, secretary-treasurer of the bridge committee of Bossier Parish, Shreveport, La., by October 22, for the steel superstructure of a combined highway and street railway bridge, over the Red river, from Shreveport to Bossier parish. The cost of the improvements will be about $170,000.

SOMERSET, PA.—An officer of the Baltimore & Ohio writes that a contract has been given to P. Farrell, Cincinnati, Ohio, for the construction of an engine house, a turntable pit, and a sand house at Somerset. The engine house is to be of brick construction, about 100 ft. long x 80 ft. wide. The sand house will be of brick construction, 175 ft. long x 15 ft. wide. The cost of the improvements will be about $25,000.

TAMAQUA, PA.—An officer of the Lehigh & New England writes regarding the report that a new terminal is to be built at Tamaqua, that the line is now connected at Tamaqua with the Panther Creek Railroad in accordance with the original plans. The company is making plans to build a freight station to be about 30 ft. x 90 ft., with one or two tracks for local freight delivery. No plans have been made for a classification yard or transfer track.

TOLEDO, OHIO.—Plans for new concrete coal and ore docks and for the necessary yards and terminals to be built in Toledo at a cost of about $2,000,000, were announced today by the Hocking Valley and the Chesapeake & Ohio. Work on the new docks will be started about November 1, and the contract will call for their completion in time for the opening of navigation in 1914. When the new docks and terminals are completed, it is said that the Pennsylvania Railroad will take over the coal and ore docks now operated by the Hocking Valley and about 2,500,000 tons of coal and thousands of tons of ore now handled by the Norfolk & Western at Sandusky, will be handled over the Toledo docks.

VANCOUVER, B. C.—See Canadian Northern Pacific under Railway Construction.

WAYCROSS, GA.—According to press reports the Atlantic Coast Line will let contracts soon for building an addition to the union station.

WICHITA, KAN.—It is reported that the Atchison, Topeka & Santa Fe will build new yards, shops and a roundhouse at Wichita.

WINTER PARK, FLA.—According to press reports the Atlantic Coast Line will put up a new station at Winter Park.

Railway Financial News.

CHICAGO, PEORIA & ST. LOUIS.—A decree of foreclosure has been granted against this company brought by the trustees of the second mortgage 5 per cent. bonds.

DENVER NORTHWESTERN & PACIFIC.—The committee, Benjamin Strong, Jr., chairman, representing holders of the purchase money collateral trust 6 per cent. gold notes of the Denver Railway Securities Co., due May 1, 1912, total issue $3,500,000, announces that it has entered into an agreement for the readjustment of the obligations of that company in connection with the reorganization of the railway company. Over 85 per cent. in amount of the notes have been deposited with the Bankers Trust Co., depositary, and all who do not assent to the plan (outlined below) are required to withdraw their notes on or before November 4. The committee says:

The plan, briefly stated, is as follows: When and if the committee shall acquire the $4,000,000 Colorado-Utah Construction Co. notes deposited to secure the $3,500,000 Securities Company's notes, and in turn shall acquire the $8,000,000 of bonds deposited as security for the notes of the Construction Company, the committee will use the said bonds if acquired by it in the purchase of the property of the railway company upon a sale under foreclosure. The railway property is to be conveyed to a new company, and contemporaneously with such transfer the committee shall receive $4,117,640 of 1st Mortgage 30-year bonds of the new company, and in addition thereto similar bonds for a sum equal to the interest at 6 per cent. per annum upon $3,500,000 from February 1, 1912, the date of the last payment of interest on the Securities Company notes, to the time of the receipt by the committee of the new bonds, which bonds are to be taken at the price of 85 per cent. The new bonds to be delivered to the committee will by their terms bear interest at the rate of 3 per cent. per annum for the first three years, 4 per cent. per annum for the fourth year and 5 per cent. per annum for the fifth year and thereafter.

To provide for the payment of a portion of the 3 per cent. interest for the first two years on the $4,117,640 bonds to be delivered to the committee, there will be deposited with the trustee under the new mortgage, in cash, 2 per cent. interest for the first year and 1 per cent. interest for the second year. In order to make up 5 per cent. per annum for the first four years, the committee will receive new first mortgage 5 per cent. bonds for the difference.

The total amount of new first mortgage bonds to be issued at the time of the transfer of the properties to the new company will not exceed $7,800,000. No additional first mortgage bonds can be issued except under restrictions to be contained in the mortgage, which restrictions are to be determined by a committee on which the committee will have representation. The mortgage securing the bonds will be a first mortgage upon the properties of the new company and a second mortgage upon the properties of the Denver Northwestern Terminal Railway Company, unless the committee elects to have the stock of the latter company deposited as collateral security. The total bonds authorized under the new first mortgage will be $35,000,000.

Mr. Erb has agreed to contribute $1,000,000 in money and to take new first mortgage bonds therefor at the price of 85 per cent., and also has agreed to purchase for cash additional 1st Mortgage bonds at 85 in order to realize an additional $132,000, with which to pay to the trustee 2 per cent. per annum on account of the first year's interest coupons and 1 per cent. per annum on account of the second year's interest coupons upon the bonds to be delivered to the committee. Besides this, there will be supplied by Mr. Erb the $1,000,000 which will be devoted to making improvements, discharging claims, mechanics' liens, expenses, etc.

Under the plan, each holder of a $5,000 deposited note will be entitled to receive $5,882 par value of new 1st Mortgage bonds and scrip of the new company, and new first mortgage bonds or scrip equal to the interest due at 6 per cent. per annum from February 1, 1912, to the date of the delivery of the new bonds to the committee, and also an amount of such bonds or scrip equal to the difference between the lesser interest and interest at 5 per cent. per annum for the first four years upon the new bonds, with proper adjustment for anticipation of interest.

The committee recommends the adoption of the plan. [The committee includes: Benjamin Strong, Jr., Chairman; George H. Burr, E. F. Shanbacker, Herman Waldeck and Henry H. Wehrhane, with B. W. Jones, 16 Wall street, as Secretary.]

LOUISVILLE & NASHVILLE.—Stockholders have voted to approve of the recommendation of the board of directors to increase the authorized capital stock from $60,000,000 to $72,000,000.

PENNSYLVANIA & ROCHESTER.—This is the new name of a Pennsylvania Railroad subsidiary which is to take over the Genessee Valley Canal Railroad and the Genessee Valley Terminal Railroad, both subsidiaries of the Pennsylvania. The merger has been authorized by the New York Public Service Commission, Second district.

ST. MARYS & WESTERN ONTARIO.—The Canadian Pacific, which has leased this property and operates it, has made a new lease for 999 years providing for the payment of interest on the outstanding bonds.

SOUTHERN RAILWAY.—At the annual meeting, Samuel M. Inman, a director, who had served since 1894, declined re-election; and John W. Grant of Atlanta, Ga., was elected for three years in his stead.

WABASH.—J. Horace Harding, Henry E. Cooper and H. Rogers Winthrop have been elected directors, succeeding John T. Terry and S. C. Reynolds, resigned, and Edwin Hawley, deceased.

[ADVERTISEMENT.]

ANNUAL REPORTS

SOUTHERN RAILWAY—EIGHTEENTH ANNUAL REPORT.

WASHINGTON, D. C., September 27, 1912.

To the Stockholders of the Southern Railway Company:

The Board of Directors submits the following report of the affairs of the Company for the year ended June 30, 1912:

INCOME STATEMENT.

	1912.	1911.	Increase. or Decrease.
Miles of Road Operated, Average	7,088.03	7,041.95	Inc. 46.08
Gross Operating Revenues	$63,590,328.90	$60,345,062.64	Inc. $3,245,266.26
Total Operating Expenses	43,696,236.39	40,926,790.08	Inc. 2,769,446.31
Net Operating Revenues	$19,894,092.51	$19,418,272.56	Inc. $475,819.95
Outside Operations — Net Revenue	64,754.67	(*Dr.*) 42,027.75	Inc. 106,782.42
Net Revenue	$19,958,847.18	$19,376,244.81	Inc. $582,602.37
Taxes	2,452,328.28	2,212,967.87	Inc. 239,360.41
Operating Income	$17,506,518.90	$17,163,276.94	Inc. $343,241.96
Other Income	3,580,074.86	3,802,518.26	Dec. 222,443.40
Total Gross Income	$21,086,593.76	$20,965,795.20	Inc. $120,798.56
Deductions from Income	3,179,772.86	3,167,189.95	Inc. 12,582.91
Total Available Income	$17,906,820.90	$17,798,605.25	Inc. $108,215.65
Interest on Mortgage, Bonded and Secured Debt	11,143,703.84	11,128,601.76	Inc. 15,102.08
Balance of Income over Charges	$6,763,117.06	$6,670,003.49	Inc. $93,113.57
Dividends on Preferred Stock: No. 21, One Per Cent., paid in April, 1911; No. 23, Two Per Cent., paid in April, 1912	$1,200,000.00	$600,000.00	Inc. $600,000.00
No. 22, One Per Cent., paid in October, 1911; Reserve for Dividend No. 24, Two and One-Half Per Cent., payable in October, 1912	1,500,000.00	600,000.00	Inc. 900,000.00
Total Dividends	$2,700,000.00	$1,200,000.00	Inc. $1,500,000.00
Balance over Dividends on Preferred Stock	$4,063,117.06	$5,470,003.49	Dec. $1,406,886.43
Additions and Betterments	44,989.42	66,045.71	Dec. 21,056.29
Balance carried to Credit of Profit and Loss	$4,018,127.64	$5,403,957.78	Dec. $1,385,830.14

PROFIT AND LOSS.

The surplus shown by the Profit and Loss statement as of June 30, 1911, was $11,445,965.08. After making provision through Income for the increase of $1,500,000 in Dividends on the Preferred Stock, and charging to Profit and Loss the remaining balance of Discount on Securities, $1,656,636.54, the surplus as of June 30, 1912, amounted to $13,756,936.13, a gain of $2,310,971.05 over the preceding year.

DISCOUNT ON SECURITIES.

As of June 30, 1911, the balance of Discount on Securities sold amounted to $1,688,029.79. There accrued during the year $28,650.00 as discount on Equipment Trust Obligations issued, making a total of $1,716,679.79 to be extinguished. Following the general practice of the Company, there was charged to Income $60,043.25, being the proportion that accrued during the year, leaving a balance in the account of $1,656,636.54, which has been charged to Profit and Loss, thus disposing of, through Income and Profit and Loss, the total net discount incurred by the Company from the sale of its securities from the date of its organization to June 30, 1912.

INTEREST.

The accrued interest on the Mortgage, Bonded and Secured Debt of the Company for the year ended June 30, 1912, was $15,102.08 greater than for the preceding year. The interest on Equipment Trust Obligations increased $45,185.42, and the interest on Bonds and Notes decreased $30,083.34. (See Table 2, page 20.)

DIVIDENDS.

A dividend of Two Per Cent., on the Preferred Stock of the Company was paid on April 24, 1912, and provision has been made for the payment on October 28, 1912, of a dividend of Two and One-Half Per Cent. declared out of Income earned during the year ended June 30, 1912.

PROPERTY INVESTMENT AND MORTGAGE DEBT.

The investment in physical property, exclusive of depreciation, has been increased $5,369,361.07, of which $2,702,595.39 was in Roadway and Structures and $2,666,765.68 in Equipment. This increase represents net additions made during the year. (See pages 24 and 25.)

The outstanding Mortgage and Collateral Trust Bonds increased during the year $26,600, while the Equipment Trust Obligations decreased $1,009,000. (See page 28.)

There were retired during the year, through the sinking fund provisions of the mortgages, $29,400 Charlottesville and Rapidan Railroad Company First Mortgage Six Per Cent. Bonds and $6,000 Franklin and Pittsylvania Railroad Company First Mortgage Six Per Cent. Bonds; and, as provided for in the First Consolidated Mortgage, $35,000 First Consolidated Mortgage Five Per Cent. Bonds were issued on account thereof and placed in the Treasury.

By reason of these and previous drawings for similar purposes, the total amount of First Consolidated Mortgage Five Per Cent. Bonds free in the Treasury on June 30, 1912, was $2,427,800.

There were drawn and taken into the Treasury in June, 1912, $5,000,000 Development and General Mortgage Four Per Cent. Bonds, which, under the terms of that mortgage, could be so drawn during the calendar year 1912 to reimburse the Treasury for expenditures made for additions and betterments. In like manner there were drawn and taken into the Treasury during the fiscal year $1,195,000 of these Bonds to reimburse the Treasury for $1,130,000, the proportion charged to capital account of Equipment Trust Obligations paid during the year, and for $65,000 advances to Subsidiary Lines.

By reason of these and previous drawings for similar purposes, the total amount of Development and General Mortgage Four Per Cent. Bonds free in the Treasury on June 30, 1912, was $19,862,000.

The Company has continued the conservation of its Working Assets through the employment of its Treasury funds.

ADDITIONS AND BETTERMENTS.

Construction of the double-track line north of Atlanta, between Crosskeys and Gainesville, Ga., has progressed during the year. A substantial part of it was placed in service on June 30, 1912, thereby materially facilitating the heavy peach movement over that line in July. It is expected that this work will be completed by January 1, 1913.

With the completion of the double-track work now in progress between Crosskeys and Gainesville, the Company will have in operation on its main line between Washington and Atlanta 288.35 miles of double track, or approximately 44 per cent. of the total mileage between those terminals.

Construction of the double-track, and revision of grades and alignment on the main line south of Franklin Junction, Va., referred to in report for the preceding year, were completed and placed in operation during the year.

The lap-sidings between Atlanta and Macon, Ga., Knoxville and Chattanooga, Tenn., and two of the three projected between Morristown, Tenn., and Asheville, N. C., were completed and placed in operation during the year. These sidings are equipped with block-houses and interlocking plants. The system of lap-sidings has been extended to the line between Macon and Jesup, Ga., and there were in course of construction at the close of the year ten such sidings, the aggregate length of which will be approximately 18,714 feet.

Construction of an additional main track between Constitution and Roseland, Ga., a distance of 2.82 miles, was begun during the year, which, when completed, will provide approximately 7 miles of double-track between Atlanta and Constitution, Ga.

During the year work progressed on the Knoxville River Front Extension, referred to in last year's report. It is expected that the track will be ready for operation by January 1, 1913.

There is in course of installation an electric automatic signal system between Denim and Charlotte, N. C., a distance of approximately 96 miles.

A new double-track connection with the Cincinnati, New Orleans & Texas Pacific Railway at Citico Junction, Tenn., equipped with interlocking signals, is in course of construction. When completed, this track will afford more prompt and direct movement of the Company's passenger trains in and out of the Union Passenger Station at Chattanooga, Tenn. It is expected that this connection will be finished by January 1, 1913.

A belt line is in course of construction at High Point, N. C., for the purpose of stimulating industrial development and facilitating the handling of traffic.

Work has progressed during the year on the new inbound freight station and office building at Atlanta, Ga. The freight facilities are now in operation, and the offices will be ready for occupancy about January 1, 1913.

During the year the Company acquired or contracted for 45 locomotives, 37 passenger-train cars, 2,990 freight-train cars and 11 pieces of road service equipment, all of modern type and standard capacity. In addition 900 gondola cars, which had passed the stage of economical operation, are in course of conversion into steel underframe ventilated box cars at the Lenoir Car Works.

MEMPHIS UNION STATION COMPANY.

Under an agreement entered into between Louisville & Nashville Railroad Company, Nashville, Chattanooga & St. Louis Railway, Southern Railway Company, St. Louis, Iron Mountain & Southern Railway Company and St. Louis Southwestern Railway Company, the Memphis Union Station Company was formed for the purpose of constructing adequate passenger terminal facilities at Memphis, Tenn., which were completed and placed in operation on April 1, 1912. The capital stock of the Station Company is owned in equal parts by the five named companies, all of which are tenants and joint users.

BLUEMONT BRANCH.

Under an agreement effective July 1, 1912, Southern Railway Company leased to the Washington & Old Dominion Railway Company, for a period of fifty years, that part of its line known as the Bluemont Branch. The Washington & Old Dominion Railway Company commenced operation of this property on July 1, 1912.

THE RELATIONS OF THE COMPANY TO THE PROGRESS OF THE SOUTH.

Agricultural and industrial development in the territory traversed by the Company's lines has continued throughout the year.

AGRICULTURE:

Southeastern farmers are appreciating more fully their manifold opportunities, and progressive men in all parts of the section are demonstrating the practicability of greatly increasing the average yields per acre of all the staple farm crops. Notable work in this direction has been done by the Company's Cotton Culture Department, mentioned in last year's report.

The Cotton Culture Department, having demonstrated its efficiency not only against the boll weevil but also in securing increased yields per

acre, has been merged into a larger Department of Farm Improvement Work, created for the purpose of extending the same system of coöperative farm demonstration work over all of the territory traversed by the lines of Southern Railway Company and the railway companies associated with it. Its object is to demonstrate to farmers methods by which the average yields of the staple crops of each locality may be increased, not on experimental or demonstration farms under special conditions and with exceptional resources, but on their own farms and with their own resources. The Department will work in harmony and coöperation with the State Commissions of Agriculture, State Agricultural Colleges and Experiment Stations, and the United States Department of Agriculture.

During the year special attention has been given to the upbuilding of the dairy industry along the Company's lines. In January, 1912, a dairy instruction car, especially arranged and fully equipped for lecture and demonstration work, was placed in operation under the direction of the Company's Dairy Agent. Ninety-nine points were visited and 12,906 people attended the lectures and demonstrations. The operation of this car has resulted in increasing dairy farm herds, and in the general improvement of conditions surrounding the dairy industry. As a means of encouraging all branches of the live stock industry, a Live Stock Agent is employed to give information and advice as to the raising, feeding and marketing of live stock.

During the year the Company operated agricultural trains in coöperation with various State Boards of Agriculture. Stops were made and meetings held at one hundred and eleven cities and towns, the total attendance being estimated at approximately 60,850. The operation of these trains aroused interest in better agricultural methods, and it is believed that the results will be beneficial to the farmers and to the Company.

LAND AND INDUSTRIAL DEPARTMENT:

The Land and Industrial Department of the Company, while separate from the Department of Farm Improvement Work, operates in close coöperation with it, each supplementing the other. In addition to securing the location of industries along the Company's lines, the Land and Industrial Department is actively engaged in the solicitation of farm immigrants from other parts of the United States and from Europe. One of its duties is to advise the Department of Farm Improvement Work as to the location of farm settlers in territory traversed by the Company's lines, in order that they may have the benefit of expert advice as to the best methods to be pursued in their new locations.

MANUFACTURING:

The development of manufacturing is proceeding more rapidly in the Southeastern States traversed by the Company's lines than in the United States as a whole. The latest report of the United States Census Bureau on Manufactures in the United States shows that the total value of the products of manufacturing in the Southeastern States traversed by the Company's lines in 1909, was $1,455,927,000, an increase over 1899 of $754,871,000, or 107.68 per cent., as compared with an increase of 79.49 per cent. for all the other States. The figures by States are as follows:

	1909.	1899.	Percentage of Increase.
Virginia	$219,794,000	$108,644,000	102.30
North Carolina	216,656,000	85,274,000	154.07
South Carolina	113,236,000	53,336,000	112.30
Georgia	202,863,000	94,532,000	114.59
Florida	72,890,000	34,184,000	113.22
Alabama	145,962,000	72,110,000	102.42
Mississippi	80,555,000	33,718,000	138.90
Kentucky	223,754,000	126,509,000	76.86
Tennessee	180,217,000	92,749,000	94.30
	$1,455,927,000	$701,056,000	107.68

The number of new industrial plants completed during the fiscal year at points on the Company's lines was 448, classified as follows:

Brick Works	27
Cotton-Seed Oil Mills	20
Fertilizer Works	26
Flour and Feed Mills	25
Lumber Mills	59
Furniture Factories	12
Other Wood-working Plants	19
Iron Industries	22
Stone Quarries, Coal and Other Mines	38
Tanneries	1
Textile Mills	16
Miscellaneous	183
Total	448

The number of industrial plants under construction at the close of the year was 73, and the number to which additions were made during the year was 197.

The year has been one of reviving activity in the cotton textile industry of the Southeastern States. The official report of the United States Census Bureau shows that for the year ended August 31, 1912, the consumption of cotton in the mills of the cotton growing states was in excess of any previous year, amounting to 2,712,622 bales.

It is noteworthy that during the year the cotton growing states consumed 57,573 more bales than the mills of all of the other states combined. The importance of this to the Company is indicated by the fact that out of a total of 11,585,839 spindles in the cotton growing states reported by the Census Bureau as of August 31, 1912, there were, as of January 1, 1912, 8,530,723 spindles in mills tributary to the Southern Railway lines.

IMMIGRATION:

There is no practical method for obtaining exact information concerning the number of families from outside territory who have settled along the Company's lines, but a conservative estimate, based upon information available, shows that a substantial number of settlers purchased lands and located along the Company's lines during the year.

During the year there was an increase in the number of real estate agencies and colonization and land companies operating in Southern Railway territory.

ROAD IMPROVEMENT:

Recognizing the importance of good country highways as factors in the development of the territory and as feeders to railways, the Company is continuing its policy of active participation in the movement for road improvement in the territory traversed by its lines. During the fiscal year a six months' tour of a special good roads train over the Company's lines was completed. This train, which was operated in coöperation with the Office of Public Roads in the United States Department of Agriculture and the American Association for Highway Improvement, carried models of the best types of modern road construction, and illustrated lectures were delivered by expert road builders. During the tour of the train 251 lectures were delivered in 210 counties and 46,733 people attended the meetings. Good Roads Associations were organized in 78 counties and interest in road improvement was greatly stimulated. The work of highway improvement is proceeding in a gratifying manner in every State traversed by the Company's lines, and the statistics of the United States Office of Public Roads show that during the calendar year 1911 the total amount available from legislative appropriations, local county and district bond issues, and local road taxes for road improvement in the Southeastern States traversed by the Company's lines was $21,884,433.

BROADER SOLICITATION:

A noteworthy policy adopted during the year has been that of greatly broadening the fields of the Company's Freight and Passenger Traffic Departments. Additional agencies have been established in the Northwest, in the Middle West, on the Pacific Coast and in Canada, making the scope of these Departments nation-wide.

The Freight Traffic agencies outside of the Company's territory serve the double purpose of soliciting the routing of freight over its lines into and out of the Southeast and of coöperating for the development of markets for Southeastern products. The latter phase of their work is being made most helpful to manufacturers and other producers and to the Company.

The outlying Passenger Traffic agencies are charged with the duty of developing business and tourist travel over the Company's lines to and from the territories in which they are located, and with the further duty of coöperating with the immigration solicitation work of the Land and Industrial Department. The Passenger Traffic Department in the Southeast and in other sections is working effectively to make the resources, opportunities and attractions of the localities along the Company's lines better known and to develop an increasing flow of travel. Passenger solicitation of all kinds is being most effectively aided by the policy of the management to keep its passenger-train service, both through and local, fully abreast of the requirements of the traveling public as to frequency of trains and character of equipment.

PANAMA CANAL AND LATIN-AMERICAN TRADE.

No part of the United States should benefit more from the approaching completion of the Panama Canal than the territory traversed by this Company's lines. The geographical relation of the Canal to the South Atlantic and Gulf ports served by these lines is advantageous; and conditions are favorable for the production in the Southeast of many of the manufactured products which are in demand in the markets of Central and South America, Asia and the Pacific Islands, to which the Canal will open a more direct route.

Increased attention is being given to the development of direct trade with the markets of the Atlantic side of South America, as well as those that will be reached by way of the Canal. During the fiscal year regular steamship service was established between New Orleans and the ports of Rio de Janeiro and Santos, Brazil, and Buenos Ayres, Argentina; and since the close of the fiscal year regular service has been inaugurated between Mobile, Ala., and the ports of Montevideo, Uruguay, and Buenos Ayres and Rosario, Argentina. The success which has attended the solicitation of traffic for these lines has been such as to encourage the hope that similar service may be established from other ports served by the Company's lines.

THE SERVICE OF EMPLOYEES.

It is a source of much pleasure to the Board to renew its expression of appreciation of the loyal and efficient service rendered during the year by officers and employees in all departments of the Company in the performance of their duties.

Details of the operations of the Company are set forth in the report of the Vice-President and General Manager.

Statements of the accounts and statistics of the Company in the usual detail will be found in the tables hereto annexed.

The accounts have been examined, as usual, by Certified Public Accountants, Messrs. Patterson, Teele & Dennis, and their certificate is made a part of this report.

Respectfully submitted, by order of the Board,

W. W. FINLEY,
President.

TABLE 3.

PROFIT AND LOSS FOR YEAR ENDED JUNE 30, 1912.

Balance at Credit of this Account June 30, 1911		$11,445,965.08
Add:		
Credit Balance of Income for the Year		4,018,127.64
		$15,464,092.72
Deduct:		
Discount on Securities charged off during the year	$1,656,636.54	
Net Miscellaneous Debits	50,520.05	
		1,707,156.59
Credit Balance June 30, 1912		$13,756,936.13

TABLE 1.

INCOME STATEMENT FOR YEAR ENDED JUNE 30, 1912, COMPARED WITH YEAR ENDED JUNE 30, 1911.

1911.			1912.	
		OPERATING REVENUES:		
$39,498,963.61		Freight Revenue	$41,508,300.38	
16,056,303.76		Passenger Revenue	16,939,811.36	
292,100.46		Miscellaneous Passenger-Train Revenue	326,202.88	
1,370,741.78		Mail Revenue	1,352,298.62	
1,816,970.04		Express Revenue	1,948,956.80	
891,164.43		Other Transportation Revenue	876,357.79	
418,818.56		Revenue from Operations other than Transportation	638,401.07	
	$60,345,062.64	TOTAL OPERATING REVENUES		$63,590,328.90
		OPERATING EXPENSES:		
$7,464,916.42		Maintenance of Way and Structures	$7,841,220.15	
9,460,756.74		Maintenance of Equipment	10,108,672.84	
1,549,403.98		Traffic Expenses	1,745,353.05	
20,662,085.84		Transportation Expenses	22,081,653.47	
1,789,627.10		General Expenses	1,919,336.88	
	40,926,790.08	TOTAL OPERATING EXPENSES		43,696,236.39
	$19,418,272.56	NET OPERATING REVENUE		$19,894,092.51
		OUTSIDE OPERATIONS—NET REVENUE		64,754.67
	42,027.75	OUTSIDE OPERATIONS—NET DEFICIT		
	$19,376,244.81	NET REVENUE		$19,958,847.18
	2,212,967.87	TAXES		2,452,328.28
	$17,163,276.94	OPERATING INCOME		$17,506,518.90
		OTHER INCOME:		
$17,499.96		Rents Accrued from Lease of Road	$20,000.00	
137,342.87		Hire of Equipment—Balance	31,206.88	
200,131.10		Rents Accrued from Joint Tracks, Yards and Terminals	204,635.85	
148,970.63		Miscellaneous Rents	131,993.72	
194,258.92		Miscellaneous Income	165,795.63	
2,659,249.26		Income from Investments	2,757,645.38	
445,055.52		Miscellaneous Interest and Commissions	268,797.40	
	3,802,518.26	TOTAL OTHER INCOME		3,580,074.86
	$20,965,795.20	TOTAL GROSS INCOME		$21,086,593.76
		DEDUCTIONS FROM TOTAL GROSS INCOME:		
		Income from Operation, Southern Railway Company in Mississippi, Alabama State Line to Columbus, Miss.	$50,950.88	
$34,440.49				
1,887,748.90		Rents Accrued for Lease of Other Roads (See Table 2)	1,865,927.33	
799,061.91		Rents Accrued for Joint Tracks, Yards and Terminals	898,444.10	
60,017.72		Miscellaneous Rents	36,242.83	
176,396.39		Separately Operated Properties	180,701.01	
125,814.78		Discount on Securities Sold—Proportion charged to Income	60,043.25	
83,709.76		Miscellaneous Deductions	87,463.46	
	3,167,189.95	TOTAL DEDUCTIONS		3,179,772.86
	$17,798,605.25	TOTAL AVAILABLE INCOME		$17,906,820.90
$10,234,565.00		INTEREST ON BONDS AND NOTES (See Table 2)	$10,204,481.66	
667,228.76		INTEREST ON EQUIPMENT TRUST OBLIGATIONS (See Table 2)	712,414.18	
226,808.00		DIVIDENDS ACCRUED ON SOUTHERN RAILWAY—MOBILE & OHIO STOCK TRUST CERTIFICATES	226,808.00	
	11,128,601.76			11,143,703.84
	$6,670,003.49	BALANCE OF INCOME OVER CHARGES		$6,763,117.06
		FROM WHICH DEDUCT:		
$600,000.00		Dividends Nos. 21 (1%) and 23 (2%) on Preferred Stock	$1,200,000.00	
600,000.00		Dividend No. 22 (1%) and Reserve for Dividend No. 24 (2½%) on Preferred Stock, payable in October, 1912	1,500,000.00	
	1,200,000.00	TOTAL DIVIDENDS		2,700,000.00
	$5,470,003.49	BALANCE OVER DIVIDENDS ON PREFERRED STOCK		$4,063,117.06
	66,045.71	ADDITIONS AND BETTERMENTS		44,989.42
	$5,403,957.78	BALANCE CARRIED TO CREDIT OF PROFIT AND LOSS		$4,018,127.64

TABLE 4.

GENERAL BALANCE SHEET, JUNE 30, 1912, AND JUNE 30, 1911.

JUNE 30, 1911.		ASSETS.	JUNE 30, 1912.	
		PROPERTY INVESTMENT:		
		ROAD AND EQUIPMENT:		
		Investment to June 30, 1907:		
$318,243,507.64		Road	$318,243,507.64	
47,796,465.54		Equipment (Including Trust Equipment)	47,796,465.54	
	$366,039,973.18	Total Investment to June 30, 1907		$366,039,973.18
		Investment since June 30, 1907:		
$15,647,735.43		Road	$18,350,330.82	
15,233,501.83		Equipment (Including Trust Equipment)	17,900,267.51	
	30,881,237.26	Total Investment since June 30, 1907		36,250,598.33
	$396,921,210.44	Total Road and Equipment		$402,290,571.51
	12,912,296.92	*Less:* Reserve for Accrued Depreciation on Equipment		13,779,492.93
	$384,008,913.52	Total Net Road and Equipment		$388,511,078.58
		SECURITIES:		
		Securities of Proprietary, Affiliated and Controlled Companies—Pledged:		
$2,487,686.26		Stocks	$2,487,686.26	
21,502,921.74		Bonds	21,508,920.74	
	$23,990,608.00			$23,996,607.00
	2,000,000.00	Bonds Issued or Assumed—Pledged		2,000,000.00
		Securities of Proprietary, Affiliated and Controlled Companies—Unpledged:		
$125,886.21		Stocks	$116,887.21	
673,419.75		Bonds	684,418.75	
	799,305.96			801,305.96
	$26,789,913.96	Total		$26,797,912.96
		OTHER INVESTMENTS:		
	$589,749.37	Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments		$419,193.34

TABLE 4—Continued.

GENERAL BALANCE SHEET, JUNE 30, 1912, AND JUNE 30, 1911.

ASSETS.

JUNE 30, 1911.			JUNE 30, 1912.	
		PROPERTY INVESTMENT (Continued):		
		MISCELLANEOUS INVESTMENTS:		
$374,587.76		Physical Property	$355,590.67	
33,468,143.91		Securities—Pledged	33,588,943.91	
9,598,039.18		Securities—Unpledged	9,450,980.28	
	43,440,770.85			43,395,514.86
	$44,030,520.22	Total		$43,814,708.20
		WORKING ASSETS:		
	$10,377,361.16	Cash		$13,048,782.30
	16,101,800.00	Securities Issued or Assumed—Held in Treasury		22,331,800.00
		Marketable Securities:		
$256,522.00		Stocks	$256,522.00	
179,059.04		Bonds	179,059.04	
53,955.00		Miscellaneous	51,455.00	
	489,536.04			487,036.04
	137,128.77	Loans and Bills Receivable		448,483.55
	566,332.38	Traffic and Car Service Balances due from other Companies		762,026.42
	415,424.63	Balance due from Agents and Conductors		467,025.40
	2,875,491.45	Miscellaneous Accounts Receivable		2,237,325.52
	3,837,425.42	Material and Supplies (See Table 11)		4,210,084.90
	535,542.30	Other Working Assets		722,674.10
	$35,336,042.15	Total		$44,715,238.23
		ACCRUED INCOME NOT DUE:		
	$938,693.31	Unmatured Interest, Dividends and Rents Receivable		$1,062,490.26
		DEFERRED DEBIT ITEMS:		
$745,771.25		Temporary Advances to Proprietary, Affiliated and Controlled Companies	$730,882.15	
108,864.50		Working Funds	136,428.19	
1,013,232.37		Other Advances	1,063,764.13	
2,318.43		Rents and Insurance Paid in Advance	2,046.61	
23,528.45		Taxes Paid in Advance	29,150.03	
1,688,029.79		Unextinguished Discount on Securities		
4,536,641.48		Special Deposits	2,923,331.19	
31,830.58		Cash and Securities in Sinking and Redemption Funds	3,525.00	
804,390.12		Cash and Securities in Insurance Reserve Fund	915,941.37	
1,569,663.48		Other Deferred Debit Items	1,377,926.99	
	10,524,270.45	Total		7,182,995.66
	$501,628,353.61	GRAND TOTAL		$512,084,423.89

LIABILITIES.

JUNE 30, 1911.			JUNE 30, 1912.	
		CAPITAL STOCK:		
$120,000,000.00		Common	$120,000,000.00	
60,000,000.00		Preferred	60,000,000.00	
	$180,000,000.00	Total		$180,000,000.00
		MORTGAGE, BONDED AND SECURED DEBT:		
$193,986,300.00		Mortgage Bonds—Outstanding	$193,956,900.00	
18,309,800.00		Mortgage Bonds—Held by Company	24,539,800.00	
	$212,296,100.00	Total		$218,496,700.00
$19,682,700.00		Collateral Trust Bonds—Outstanding	$19,738,700.00	
42,000.00		Collateral Trust Bonds—Held by Company	42,000.00	
	19,724,700.00	Total		19,780,700.00
	10,107,000.00	Notes—Outstanding		10,107,000.00
	$242,127,800.00	Total (See Table 5)		$248,384,400.00
	17,389,000.00	Equipment Trust Obligations (See Table 6)		16,380,000.00
	$259,516,800.00	Total		264,764,400.00
	33,099,000.00	OUTSTANDING SECURITIES ON LEASEHOLD ESTATES		33,099,000.00
		WORKING LIABILITIES:		
$470,339.36		Loans and Bills Payable	$455,000.00	
656,868.35		Traffic and Car Service Balances due to other Companies	817,608.07	
4,861,646.68		Audited Vouchers, Accounts and Wages Unpaid	5,984,377.17	
207,897.90		Miscellaneous Accounts Payable	344,295.59	
2,876,213.70		Matured Interest, Dividends and Rents Unpaid, including amounts due July 1	2,880,202.44	
29,300.00		Matured Mortgage, Bonded and Secured Debt unpaid—Bonds not presented for Redemption	3,400.00	
1,129,355.26		Other Working Liabilities	1,635,256.55	
	10,231,621.25	Total		12,120,139.82
		ACCRUED LIABILITIES NOT DUE:		
$1,713,954.50		Unmatured Interest and Rents Payable	$1,697,303.31	
909,467.67		Taxes	953,013.02	
	2,623,422.17	Total		2,650,316.33
		DEFERRED CREDIT ITEMS:		
$2,245,362.71		Operating Reserves	$1,983,983.09	
742,381.11		Other Deferred Credit Items	932,206.61	
	2,987,743.82	Total		2,916,189.70
		APPROPRIATED SURPLUS:		
$600,000.00		Reserves for Dividends No. 22, 1 Per Cent., and No. 24, 2½ Per Cent., on Preferred Stock, payable October, 1911 and 1912, respectively	$1,500,000.00	
319,411.17		Additions to Property since June 30, 1907, through Income	361,500.54	
804,390.12		Insurance Reserve Fund	915,941.37	
	1,723,801.29	Total		2,777,441.91
	11,445,965.08	PROFIT AND LOSS		13,756,936.13
	$501,628,353.61	GRAND TOTAL		$512,084,423.89

THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY—SEVENTEENTH ANNUAL REPORT.

OFFICE OF
THE ATCHISON, TOPEKA & SANTA FE RAILWAY SYSTEM,
No. 5 Nassau Street, New York City.
SEPTEMBER 10, 1912.

To the Stockholders:

Your Directors submit the following report for the fiscal year July 1, 1911, to June 30, 1912, inclusive.

The Lines comprising the Atchison System, the operations of which are embraced in the following statements, are as follows:

	June 30, 1912.	June 30, 1911.
Atchison, Topeka & Santa Fe Railway	8,200.86 miles.	7,549.69 miles.
Rio Grande & El Paso Railroad	20.21 "	20.21 "
Gulf, Colorado & Santa Fe Railway	1,596.06 "	1,537.48 "
Eastern Railway of New Mexico	.....	225.21 "
Pecos & Northern Texas Railway	478.67 "	296.12 "
Pecos River Railroad	54.24 "	54 24 "
Santa Fe, Prescott & Phoenix Railway	.....	364 24 "
Southern Kansas Railway of Texas	124.92 "	124.92 "
Texas & Gulf Railway	125.80 "	96.14 "
Gulf & Interstate Railway of Texas	71.97 "	71.97 "
Concho, San Saba & Llano Valley Railroad.	60.15 "	60.15 "
	10,732.88 "	10,400.37 "

Increase during the year 332.51 miles.

The average mileage operated during the fiscal year ending June 30, 1912, was 10,627.92 miles, being an increase of 277.79 miles as compared with the average mileage operated during the preceding fiscal year.

The mileage formerly operated as the Eastern Railway of New Mexico and Santa Fe, Prescott and Phoenix Railway was operated by the Atchison, Topeka and Santa Fe Railway on June 30, 1912, and, therefore, is so shown as of that date.

In addition to lines covered by this report there were completed on June 30, 1912, 50.92 miles of additional line, all of which will be ready for operation in the near future.

The Company also controls, through ownership of stocks and bonds, other lines aggregating 63.58 miles, and is interested jointly with other companies in 599.43 miles.

For detailed statement of present mileage and of changes in mileage since last Annual Report, see pages 42 to 46.

INCOME STATEMENT.

The following is a summary of the transactions of the System for the years ending June 30, 1911 and 1912.

	1911.	1912.
Operating Revenues	$107,565,115.62	$107,752,359.91
Operating Expenses	70,768,251.57	71,273,202.97
Net Operating Revenue	$36,796,864.05	$36,479,156.94
Taxes	3,474,606.88	4,206,453.85
Operating Income	$33,322,257.17	$32,272,703.09
Other Income	2,207,366.07	2,569,968.22
Gross Corporate Income	$35,529,623.24	$34,842,671.31
Rentals and Other Charges	1,446,236.38	1,521,570.56
	$34,083,386.86	$33,321,100.75
Fixed charges, including accrued interest on Adjustment Bonds	12,712,319.31	13,660,859.50
Net Corporate Income (representing amounts available for dividends and surplus and for necessary but unproductive or only partially productive expenditures)	$21,371,067.55	$19,660,241.25

From the net corporate income for the year the following sums have been deducted:

DIVIDENDS ON PREFERRED STOCK—		
No. 27 (2½%) paid Feb. 1, 1912	$2,854,345.00	
No. 28 (2½%) paid Aug. 1, 1912	2,854,345.00	
	$5,708,690.00	
DIVIDENDS ON COMMON STOCK—		
No. 25 (1½%) paid Sept. 1, 1911	$2,538,907.50	
No. 26 (1½%) paid Dec. 1, 1911	2,538,982.50	
No. 27 (1½%) paid March 1, 1912	2,539,912.50	
No. 28 (1½%) paid June 1, 1912	2,550,382.50	
	10,168,185.00	
Appropriation for Fuel Reserve Fund	396,959.94	
Appropriated for Additions and Betterments (See comments on "Additions and Betterments," p. 9)	3,300,000.00	
		19,573,834.94
Surplus carried to Profit and Loss		$ 86,406.31
Surplus to credit of Profit and Loss June 30, 1911	$20,566,706.63	
Discount on Bonds written off	182,996.95	
		20,383,709.68
Surplus to credit of Profit and Loss June 30, 1912		$20,470,115.99

Income from sources other than earnings from operation consisted of interest on cash in banks and sums collected as interest and dividends upon bonds and stocks of companies, the operations of which are not included in the System accounts.

During the fiscal year the sum of $200,000 in cash was received as the net proceeds of sales of land embraced in the Santa Fe Pacific Land Grant, but this was directly written off the book value of Railroads, Franchises and Other Property, and the transaction does not appear in the Income Account.

CAPITAL EXPENDITURES AND REDUCTION OF BOOK VALUES.

The total charges to Capital Account, as shown by the General Balance Sheet, page 26, at June 30, 1912, aggregated $621,869,989.29 as compared with $609,287,764.18 at June 30, 1911, an increase during the year of $12,582,225.11, which analyzes as follows:

Construction and acquisition of new mileage, including the acquisition of bonds and stocks of other railway and terminal companies:

California, Arizona & Santa Fe Ry.	$23,858,989.28		
Less: Investment in the property and securities of companies merged in The C. A. & S. F Ry. Co., reported in previous years (see page 28)	22,379,112.52	$1,479,876.76	
Concho, San Saba & Llano Valley R. R.		4,323.06	
Dodge City & Cimarron Valley Ry.		354,077.49	
Eastern Ry. of New Mexico		944,727.86	
Grand Canyon Ry.		8,669.72	
Gulf, Beaumont & Great Northern Ry.		1,888.16	
Gulf, Beaumont & Kansas City Ry.		3,484.00	
Gulf, Colorado & Santa Fe Ry.		763,263.67	
		$3,560,310.72	
Sunset Ry.	$386,343.94		
Less: Investment in securities of Sunset R. R. and Sunset Western Ry. consolidated into the Sunset Ry., reported in previous years	303,415.78	82,928.16	
Union Terminal Co. of Dallas		3,000.00	
Wichita Union Terminal Ry.		10,000.00	
			$3,656,238.88
Additions and Betterments—System Lines:			
Right of Way, Station Grounds and Real Estate		$59,909.69	
Widening Cuts and Fills, including Protection and Banks		206,828.73	
Grade Reductions and Changes of Line		298,783.48	
Bridges, Trestles and Culverts		628,382.08	
Ballast, including cost of spreading and putting under track		1,272,127.75	
Increased Weight of Rail		438,770.69	
Frogs, Switches, Track Fastenings, and Appurtenances		660,516.41	
Additional Main Tracks		1,546,793.78	
Sidings and Spur Tracks		292,504.87	
Terminal Yards		331,019.59	
Track Elevation, Elimination of Grade Crossings, and Improvements of Over and Under Grade Crossings		*75,834.09*	
Interlocking, Block and Other Signal Apparatus		33,861.14	
Telegraph and Telephone Lines		20,531.99	
Buildings, Shops, Dock and Wharf Property		904,094.81	
Shop Machinery and Tools		169,382.96	
Additional Equipment		3,231,531.13	
Betterments to Equipment		133,833.80	
Other Additions and Betterments		123,945.46	
			10,276,984.27
			$13,933,223.15
Fuel Lands and Other Properties:			
Fuel Lands		$ 8,000.00	
Ice Plant, Belen		134,556.55	
Santa Barbara Tie & Pole Co		1,013.47	
Tie and Timber Lands		53,530.49	
Real Estate held for future use		206,257.61	
Miscellaneous Items		*38,191.15*	
			365,166.97
Other Investments			944,956.17
Total Charges			$15,243,346.29
Reduction of Book Values:			
Garden City, Gulf & Northern R. R.		$ 12,000.00	
Gulf, Beaumont & Kansas City Ry.		3,500.00	
Houston Belt & Terminal Ry.		21,620.80	
Santa Fe Pacific R. R.—Land Sales		200,000.00	
Ice Plant, San Bernardino		39,145.71	
Texas Tie & Lumber Preserving Co.		1,697,62	
Reserve for Accrued Depreciation		2,383,157.05	
			2,661,121.18
Net Increase in Capital Account during the year			$12,582,225.11

Credits in italics.

ADDITIONS AND BETTERMENTS.

The Additions and Betterments aggregating $10,276,984.27 are classified in accordance with the rules of the Interstate Commerce Commission and relate to expenditures which under the Commission's rules cannot be charged to operating expenses. But the use of the term "Additions and Betterments" does not indicate that all such expenditures are or will be productive. To keep a great railroad property and its equipment up to date and to meet the increasing demands of the public, it is essential to make many so-called additions and betterments which are either wholly unproductive or only partially productive or productive only at the expiration of many years from the time they are made. It will be noted that $3,300,000 of the $10,276,984.27 of Additions and Betterments has been appropriated from the corporate income for the year (see Income Statement, page 6).

MAINTENANCE OF EQUIPMENT.

The following statement shows the sums charged to Operating Expenses for Maintenance of Equipment during each year since July 1, 1896:

Year Ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897	6,443.81	$3,443,884.82	$ 534.45
1898	6,936.02	4,659,277.99	671.75
1899	7,032.62	4,810,795.64	684.07
1900	7,341.34	5,267,832.40	717.56
1901	7,807.31	6,257,456.57	801.49
1902	7,855.38	7,864,951.25	1,001.22
1903	7,965.13	8,510,543.09	1,068.48

Year Ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1904	8,179.59	10,006,135.41	1,223.31
1905	8,305.40	10,914,864.47	1,314.19
1906	8,433.99	10,720,040.43	1,271.05
1907	9,273.15	11,779,846.64	1,270.32
1908	9,415.01	14,246,621.44	1,513.18
1909	9,794.86	13,903,897.37	1,419.51
1910	9,916.33	15,560,047.44	1,569.13
1911	10,350.13	16,686,145.45	1,612.17
1912	10,627.92	16,521,231.41	1,554.51

For the year ending June 30, 1912, maintenance charges, including renewals and depreciation, averaged as follows:

Per locomotive	$4,381.72
Per locomotive mile	.1591
Per passenger car, including mail and express	1,009.64
Per passenger car mile	.0111
Per freight car	100.47
Per freight car mile	.0095

The foregoing average maintenance charges include a proportion of unlocated expenditures for Maintenance of Equipment charged to Superintendence, Shop Machinery and Tools, Injuries to Persons, Stationery and Printing, Other Expenses, and Maintaining Joint Equipment at Terminals. Beer and refrigerator cars are not taken into consideration in arriving at the foregoing averages, such cars being operated by the Santa Fe Refrigerator Despatch Company, which bears the expense of their maintenance.

The following charges were made to Additions and Betterments in respect of additional equipment purchased and built during the year and in respect of payments made for equipment received during prior years:

122 Locomotives	$2,996,980.50
46 Passenger-Train Cars	539,531.10
186 Freight-Train Cars*	184,155.73
213 Miscellaneous Cars	233,409.27
Ferry Boat (additional charges)	8,504.40
	$3,962,581.00

Less—Value of equipment retired during the year as follows:

38 Locomotives	$131,966.62
6 Passenger-Train Cars	12,019.72
1,141 Freight-Train Cars	563,835.06
22 Miscellaneous Cars	5,841.18
Adjustment of value of equipment transferred between system lines, representing depreciation accrued to date of transfer	17,387.29
	731,049.87
	$3,231,531.13

*The Company has on order to be delivered during the present calendar year about five thousand freight-train cars.

A statement of the locomotives in service and of their tractive power will be found on page 41.

MAINTENANCE OF WAY AND STRUCTURES.

The following statement shows the sums charged to Operating Expenses for Maintenance of Way and Structures during each year since July 1, 1896:

Year Ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897	6,443.81	$6,282,923.15	$ 975.03
1898	6,936.02	8,281,397.88	1,193.97
1899	7,032.62	7,672,107.62	1,090.93
1900	7,341.34	6,354,372.10	865.56
1901	7,807.31	6,433,840.36	824.08
1902	7,855.38	6,141,466.39	781.82
1903	7,965.13	9,304,892.04	1,168.20
1904	8,179.59	9,170,234.07	1,121.11
1905	8,305.40	11,385,418.33	1,370.85
1906	8,433.99	12,475,407.97	1,479.18
1907	9,273.15	15,286,062.66	1,648.42
1908	9,415.01	14,120,828.02	1,499.82
1909	9,794.86	12,884,406.81	1,315.43
1910	9,916.33	17,807,136.20	1,795.74
1911	10,350.13	16,059,786.90	1,551.65
1912	10,627.92	16,076,833.75	1,512.70

COMPARISON OF OPERATING RESULTS.

The following is a statement of revenues and expenses of the System for the fiscal year ending June 30, 1912, in comparison with the previous year:

	Year Ending June 30, 1912.	Year Ending June 30, 1911.	Increase. Decrease.
OPERATING REVENUES:			
Freight	$ 71,529,574.67	$ 71,787,200.89	—$257,626.22
Passenger	27,453,525.41	27,204,867.66	248,657.75
Mail, Express and Miscellaneous	8,769,259.83	8,573,047.07	196,212.76
Total Operating Revenues	$107,752,359.91	$107,565,115.62	$187,244.29
OPERATING EXPENSES:			
Maintenance of Way and Structures	$ 16,076,833.75	$ 16,059,786.90	$ 17,046.85
Maintenance of Equipment	16,521,231.41	16,686,145.45	—164,914.04
Traffic Expenses	2,416,746.46	2,249,898.69	166,847.77
Transportation Expenses	33,733,667.06	33,183,520.09	550,146.97
General Expenses	2,524,724.29	2,588,900.44	—64,176.15
Total Operating Expenses	$ 71,273,202.97	$ 70,768,251.57	$504,951.40
Net Operating Revenues	$ 36,479,156.94	$ 36,796,864.05	—$317,707.11
Ratio of Operating Expenses to Operating Revenues	66.15	65.79	.36

The following averages are deducted from tables set forth on pages 36 and 39.

The average tons of freight (revenue and company) per loaded car mile decreased from 18.74 to 18.52, or 1.17 per cent.

The average tons of freight (revenue and company) carried per freight-train mile (freight, mixed and company-supply) increased from 394.72 to 399.94, or 1.32 per cent.

The average freight revenue per revenue freight-train mile increased from $3.19 to $3.26, or 2.19 per cent.

The average passenger revenue per revenue passenger-train mile decreased from $1.21 to $1.18, or 2.48 per cent.

The average passenger-train revenue per revenue passenger-train mile decreased from $1.51 to $1.47, or 2.65 per cent.

The tons of freight carried one mile (revenue and company) decreased 96,347,956, or 1.07 per cent., while miles run by freight cars (loaded and empty) in freight, mixed and company-supply trains decreased 6,169,042, or .90 per cent., and the mileage of such trains decreased 538,434, or 2.36 per cent.

The number of passengers carried one mile increased 5,111,995, or .40 per cent. while miles run by passenger cars in passenger and mixed trains increased 5,657,442, or 4.29 per cent., and the mileage of such trains increased 773,537, or 3.44 per cent.

The following is a consolidated statement of the business of the System for each fiscal year during the period since January 1, 1896:

Fiscal Year Ending June 30.	Average Miles Operated.	Gross Revenues Including Income from Other Sources.	Expenses, Including Taxes, Rentals and Other Charges.	Interest on Bonds.	Net Corporate Income.
1897*	6,443.81	$44,532,628.99	$36,038,455.30	$8,440,387.91	$ 53,785.78
1898	6,936.02	39,396,126.41	30,513,553.17	7,045,988.30	1,836,584.94
1899	7,032.62	40,762,933.47	29,332,964.11	7,241,972.00	4,187,997.36
1900	7,341.34	46,498,899.04	29,414,427.56	7,345,166.50	9,739,304.98
1901	7,807.31	54,807,379.78	34,502,039.87	7,830,810.83	12,474,529.08
1902	7,855.38	60,275,944.33	36,272,432.45	8,438,985.00	15,564,526.88
1903	7,965.13	63,668,390.99	40,635,576.48	9,134,485.24	13,898,329.27
1904	8,179.59	69,419,975.41	44,641,434.10	9,418,770.00	15,359,771.31
1905	8,305.40	69,189,739.65	47,835,883.50	9,611,510.09	11,742,346.06
1906	8,433.99	79,390,749.05	51,035,355.71	10,622,184.22	17,733,209.12
1907	9,273.15	94,436,574.68	61,779,916.16	11,487,934.70	21,168,723.82
1908	9,415.01	91,289,770.61	65,031,582.67	12,579,301.77	13,678,886.17
1909	9,794.86	95,424,091.89	61,458,019.13	13,548,081.93	20,417,990.83
1910	9,916.33	107,543,250.16	75,133,314.54	11,984,151.36	20,425,784.26
1911	10,350.13	109,772,481.69	75,689,094.83	12,712,319.31	21,371,067.55
1912	10,627.92	110,322,328.13	77,001,227.38	13,660,859.50	19,660,241.25

*18 months.

The following statement shows the gross operating revenues of the System (exclusive of income from other sources) per mile of road operated for each fiscal year since July 1, 1896:

Year Ending June 30.	Gross Operating Revenues.	Average Per Mile of Road.
1897	$30,621,230.10	$4,752.04
1898	39,214,099.24	5,653.69
1899	40,513,498.63	5,760.80
1900	46,232,078.23	6,297.49
1901	54,474,822.61	6,977.41
1902	59,135,085.53	7,527 97
1903	62,350,397.28	7,827.92
1904	68,171,200.18	8,334.31
1905	68,375,837.25	8,232.70
1906	78,044,347.25	9,253 55
1907	93,683,406.91	10,102.65
1908	90,617,796.38	9,624.82
1909	94,265,716.87	9,624.00
1910	104,993,194.67	10,587.91
1911	107.565.115.62	10,392.63
1912	107,752,359.91	10,138.61

The following statement shows the development of the freight and passenger revenues of the System since July 1, 1896:

Year Ending June 30.	Freight Revenue.	Passenger Revenue.
1897	$22,067,686.77	$5,574,288.31
1898	28,588,716.76	7,347,361.59
1899	29,492,586.65	8,126,141.85
1900	33,729,332.83	9,334,661.57
1901	39,052,557.43	11,678,017.25
1902	41,815,607.05	13,439,384.57
1903	44,622,438.71	13,469,985.78
1904	47,762,653.23	15,433,773.63
1905	47,408,982.36	16,045,380.27
1906	54,598,902.82	18,013,988.56
1907	65,500,309.42	21,171,629.08
1908	61,848,638.51	21,643,427.49
1909	64,212,638.10	22,734,505.32
1910	71,194,055.59	25,437,181.98
1911	71,787,200.89	27,204,867.66
1912	71,529,574.67	27,453,525.41

CAPITAL STOCK AND FUNDED DEBT.

The outstanding Capital Stock (deducting stock in treasury) on June 30, 1911, consisted of:

Common	$168,430,500	
Preferred	114,173,730	
		$282,604,230
Issued during the year:		
Common Stock issued in exchange for Convertible Bonds retired		1,699,000
Capital Stock outstanding June 30, 1912:		
Common	$170,129,500	
Preferred	114,173,730	
		$284,303,230

The outstanding Funded Debt of the System (deducting bonds in treasury) amounted on June 30, 1911, to $329,101,820

The following changes in the Funded Debt occurred during the year:

Obligations issued:		
California-Arizona Lines First and Refunding Mortgage 4½% Bonds		$18,299,695
Obligations Purchased or Retired:		
Serial Debenture 4% Bonds,		
Series J	$1,032,000	
Series K	1,710.000	
Series L	312,000	
Convertible 4% Bonds	1,642,000	
Convertible 5% Bonds	57.000	
Miscellaneous Divisional Bonds	3,500	
		4,756,500
Increase of Funded Debt		$13,543,195
Total System Funded Debt outstanding June 30, 1912		$342,645,015

Interest charges for the year ending June 30, 1913, will be approximately $14,040,000, or an average monthly charge of about $1,170,000.

TREASURY.

Neither this Company nor any of its auxiliaries has any notes or bills outstanding.

The Company held in its treasury on June 30, 1912, $41,906,232.86 cash, and had available $3,780,000 General Mortgage Bonds, including bonds not yet certified by the Trustee. The Company also has in the treasury unpledged a large amount of stocks and bonds of other companies, of which part are carried in the balance sheet as Investments and part are included under Railroads, Franchises and Other Property.

The Atchison, Topeka & Santa Fe Ry. Co. and The California, Arizona & Santa Fe Ry. Co. (more particularly referred to on page 17) executed an indenture dated March 1, 1912, by which the latter company mortgaged its properties to secure an issue of Four and One-Half per cent. California-Arizona Lines First and Refunding Mortgage Bonds of The Atchison, Topeka & Santa Fe Ry. Co., for $50,000,000 maturing March 1, 1962. $18,299,695 of these bonds have been issued and sold.

FUEL RESERVE FUND.

The fund has been increased during the year by earnings derived from sundry fuel properties, and decreased by certain payments for fuel properties as follows:

Amount to credit of Fund June 30, 1911	$1,431,077.35
Added during the year	396,959.94
	$1,828,037.29
Deduct sums paid for fuel properties	764.71
In Fund June 30, 1912	$1,827,272.58

On June 30, 1912, there remained in the treasury of the Cherokee & Pittsburg Coal and Mining Company an unexpended cash surplus amounting to $74,058.20, so that the total amount available for replacement of fuel properties in which your Company is interested is $1,901,330.78.

NEW MEXICO & ARIZONA RAILROAD COMPANY AND SONORA RAILWAY COMPANY, LIMITED.

During the year the securities of the above companies owned by your company were sold to the Southern Pacific Railroad Company. The railways of these companies have been operated by the Southern Pacific Company under lease, the term of the lease running until September 1, 1979.

THE CALIFORNIA, ARIZONA & SANTA FE RAILWAY CO.

This company was organized during the year and acquired from the Southern Pacific Railroad Company the line between Needles and Mojave, California, and acquired also the lines formerly owned by the Arizona and California Railway Company, Barnwell and Searchlight Railway Company, Bradshaw Mountain Railroad Company, The California Eastern Railway Company, Fresno County Railway, Fullerton and Richfield Railway Company, Kings River Railway Company, Oakland and East Side Railroad Company, Oakdale Western Railway Company, Perris and Lakeview Railway Company, Prescott and Eastern Railroad Company, Randsburg Railway Company, and Santa Fe, Prescott and Phoenix Railway Company. The lines so acquired are located in California and Arizona and aggregate 834 miles in length.

NEEDLES-MOJAVE LINE.

During the year this line, between Needles and Mojave, California, a distance of 242.19 miles, which has been operated under lease as a part of your main line between Chicago and the Pacific Coast, was acquired from the Southern Pacific Railroad Company, title being vested in The California, Arizona & Santa Fe Railway Company.

DODGE CITY AND CIMARRON VALLEY RAILWAY.

In order to serve the needs of Southwestern Kansas this company was organized to construct a line extending from Dodge City, Kansas, in a generally southwesterly direction, and the construction of about 60 miles of the projected line has been undertaken and at this date is practically completed. An additional 60 miles will be constructed during the present fiscal year.

GALVESTON CAUSEWAY.

In May of this year this structure, connecting Galveston Island with the Texas main land, was formally opened for traffic, having been under construction since September, 1909, pursuant to an agreement between the County of Galveston, the Gulf, Colorado and Santa Fe Railway Company and certain other transportation companies entering Galveston. The causeway has a total length of 10,642 feet and consists of a steel lift-bridge over the channel about midway across the bay, fourteen seventy-foot reinforced concrete arches and sand embankment approaches protected by reinforced concrete. The causeway carries two steam railroad tracks with additional space for electric railroad and county highway.

NORTHWESTERN PACIFIC RAILROAD.

As set forth in this company's Twelfth Annual Report certain properties in Northern California owned by your company and the Southern Pacific Company were consolidated into the Northwestern Pacific Railroad Company, one-half of the capital stock of which was vested in your company and the other half in the Southern Pacific Company. One of the objects of this transaction was to insure the construction of a link connecting certain of these properties between Willetts and Shively, California, a distance of 105.67 miles. Construction of this line has been in progress throughout the year. 39.52 miles have been completed and work is being pushed on the remaining 66.15 miles. When this work is completed the Northwestern Pacific Railroad will have a continuous line from Sausalito on San Francisco Bay to Eureka and Trinidad in Northern California, which with its branch lines will make a total of 511.67 miles. The new line will run through what is practically virgin territory, and its construction should materially increase the traffic now interchanged by your company with the Northwestern Pacific Company.

PORT BOLIVAR IRON ORE RAILWAY.

This road, 30 miles in length, was constructed by private parties for the purpose of developing certain iron ore properties north of Longview and is being operated by this company under a temporary arrangement terminable at the pleasure of either party.

SUNSET RAILWAY.

Pursuant to an agreement between the Sunset Railroad Company and the Sunset Western Railway Company, these two lines were consolidated under articles of incorporation and consolidation filed March 20, 1912, the new company so formed being known as the Sunset Railway Company. One-half of the capital stock of the new company was vested in your company and the other half in the Southern Pacific Company. The consolidation was made in the interest of economy of operation.

WEST TEXAS CONSTRUCTION.

The lines in West Texas under construction at the date of the last annual report have been completed during the year. The entire line between Coleman and Lubbock was opened for traffic on December 1, 1911, and the line Lometa to Eden was completed into the latter point and opened for traffic January 1, 1912. The extension of the Coleman-Lubbock Line from the latter point to Texico, N. M., a distance of 89 miles, has been authorized, and it is expected this line will be completed and opened for traffic by the close of the present fiscal year. The construction of this extension will complete the new through line between the Pacific Coast and the Gulf of Mexico via Belen and Texico.

ADDITIONAL MAIN-TRACK MILEAGE.

The mileage of second track in operation on June 30, 1912, was 801.90 miles as compared with 687.58 miles at the close of the preceding fiscal year, being an increase of 114.32 miles.

SECOND TRACK WORK IN PROGRESS.

MISSOURI DIVISION:		
Floyd to Sibley, Mo.	3.63	miles.
LINES WEST TO ALBUQUERQUE:		
Rito to Laguna, N. M.	9.16	"
Baca to Perea, N. M.	27.49	"
Crookton to Seligman, Ariz.	10.36	"
Seligman to Yampai, Ariz.	22.77	"
Topock, Ariz., to Needles, Cal.	11.75	"
Keenbrook to Highland Junction, Cal.	12.62	"
Total	97.78	"

The second track work on the Missouri Division is being carried on in connection with the reconstruction of the bridge over the Missouri River at Sibley, which it is expected will be completed by the close of the current fiscal year. All the work in progress on the Lines West of Albuquerque will be completed by January 1st next, making a total on that date of 896.05 miles of second track in operation.

TAXES.

Attention is called to the increasing burden of taxation as shown by the following table for the System:

Year Ending June 30.	Taxes.	Total Operating Revenues.	Net Operating Revenue.	% Net Operating. Revenue.	Operated Mileage.
1907...	$2,502,650.49	$93,683,406.91	$34,815,505.67	7.19	9,350.28
1908...	3,244,595.81	90,617,796.38	29,793,832.77	10.89	9,430.60
1909...	3,015,218.53	94,265,716.87	36,770,521.68	8.20	9,792.50
1910...	4,006,418.83	104,993,194.67	35,231,374.79	11.37	9,961.25
1911...	3,474,606.88	107,565,115.62	36,796,864.05	9.44	10,400.37
1912...	4,206,453.85	107,752,359.91	36,479,156.94	11.53	10,732.88

Percentage of increase in five years:

Taxes	68.1	per cent.
Total Operating Revenues	15.0	"
Net Operating Revenue	4.8	"
Operated Mileage	14.8	"

Your Directors again acknowledge with pleasure the faithful and efficient services rendered during the year by the officers and employes of the Company.

EDWARD P. RIPLEY,
President.